Afghanistan

Medizinische Länderkunde
Geomedical Monograph Series

2

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Medizinische Länderkunde

Beiträge zur geographischen Medizin

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Regional Studies in Geographical Medicine

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AFGHANISTAN

Eine geographisch-medizinische Landeskunde / A Geomedical Monograph

von / by

Ludolph Fischer

Professor Dr. med.

Ordinarius emerit. für Tropenmedizin an der Universität Tübingen

Mit 16 Tafeln, 15 Abbildungen und 10 Karten

With 16 Plates, 15 Figures, and 10 Maps

Herstellung der Karten 2—10 in der Geomedizinischen Forschungsstelle der Heidelberger Akademie der Wissenschaften, der Karte 1 nach Entwurf von Dr. B. Carlberg in der Firma Henning Wocke, Atelier für Kartographie, Karlsruhe, in der auch der Druck der Karten erfolgte.

Preface

With this geomedical study of Afghanistan, the second volume in the "Geomedical Monograph Series — Regional Studies in Geographical Medicine" is presented. It appears as a part of the scientific publications of the Heidelberg Academy of Sciences. This work also owes its origin to an idea put forward by the late ERNST RODENWALDT, Dr. med., Dr. phil. h. c., Professor Ordinarius of Hygiene and Head of the Geomedical Research Unit of the Heidelberg Academy of Sciences. His suggestion that I should record my experiences in Afghanistan in the form of a monograph coincided with a wish which I had long cherished.

From 1938 to 1941 and again from 1950 to 1952, I worked in Afghanistan as a physician and scientist, and visited the country again for several months in 1964. The numerous tours I made enabled me to come to know the Afghan area as well as its epidemiological characteristics and my medical work helped me to make contact with its people and their way of life. From the very first day I felt at home in Afghanistan and in the course of time I grew very fond of its land and people. Having witnessed the development of Afghanistan over a period of thirty years, and having spent about six years helping in its construction in my own sphere, I now feel justified in my attempt at collating and publishing this work on the geomedical peculiarities of the country. It would seem to be a useful task at this juncture when a long epoch, characterized among other things by fateful disease strikes, moves towards its close under the influence of modern development works.

A thorough analysis of the material would have been impossible had it not been for the constructive help of official departments and numerous friendly colleagues. In carrying out the tour in 1964 I received a substantial grant from the Deutscher Akademischer Austauschdienst. In Kabul the Royal Ministry of Health, then under the direction of His Excellency Dr. A. RAHIM, made valuable information available to me and by means of its generous collaboration I was able to undertake the very necessary travels in the country. The Institute of Public Health, the Malaria Institute (advised by Dr. WENZEL) together with Afghan colleagues and friends have contributed important data; Dr. MANI, Director of the WHO Regional Office for Southern Asia in New Delhi, made available the specialist reports of WHO experts engaged in Afghanistan to me. From the circle of German colleagues, Dr. ERNA BÖSHAAR of Tübingen performed the conversion of the blood groups, the distribution of which is not always uniformly stated in the literature, to the ABO system. The basic map was drafted by Dr. B. CARLBERG of Murnau and was checked by Prof. Dr. C. RATHJENS of Saarbrücken for names of towns, which have been repeatedly changed in recent times. Dr. K. DAUBERT of Tübingen assisted in the compilation of the climatological details. Professor Dr. FÜHNER of Hamburg supplied essential details on the range of activities carried out by the Institute of Public Health and Professor Dr. H. HAHN of Bonn made available the material he collected for the construction of a population map. Dr. M. KAEVER of Münster, compiled the geological section; Dr. DOROTHEA BLIESKE and Dr. E. KÜMMERER of Tübingen assisted in obtaining literature and in the transcription of Persian disease names. Professor Dr. O. H. VOLK of Würzburg checked the section on the natural vegetation as well as the titles of the botanical illustrations. The link with the South Asia Institute of the University of Heidelberg and with Professor Dr. KRAUS of the Ruhr University at Bochum, as well as with several specialists belonging to the "Arbeitsgemeinschaft Afghanistan" provided valuable support. The library of the WHO in Geneva gave me access to numerous publications. To all concerned I extend my thanks.

My thanks also go to Dr. and Mrs. J. A. HELLEN, Newcastle upon Tyne, for the translation of the text into English.

My especial thanks are addressed to the Editor of the Geomedical Monograph Series — Regional Studies in Geographical Medicine Professor Dr. H. J. JUSATZ, Director of the Institute of Tropical Hygiene at the South Asia Institute in the University of Heidelberg and to the team of the Geomedical Research Unit of the Heidelberg Academy of Sciences for their untiring assistance in the obtaining of literary material, the compilation of lists, figures and maps and last, but not least, in the often difficult editorial work. The Publisher Springer-Verlag Berlin – Heidelberg – New York receives my thanks for its willingness to co-operate in the lay-out of this book.

LUDOLPH FISCHER

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Introduction

The function of a regional medical geography is not merely to describe those diseases which occur in a given country but rather to seek to move beyond this descriptive phase to an elucidation of relationships—relationships between the region, its climate and the way of life of the people on the one hand, and the distribution and localization of diseases on the other.

If we follow E. MARTINI's definition, then soil and climate are to be regarded as "primary" factors furnished by nature for the occurrence and spread of diseases. Man's way of life as expressed in his house types and agriculture, stock raising, nutrition, clothing and even the mode of communal life (including its cult and ritual aspects), have also been shaped by soil and climate. In their totality they represent the "secondary" factors in the spread of disease and there is scarcely any other area in which the relations between natural and cultural factors and the behaviour of numerous diseases are so clearly recognisable as in the arid countries of the Middle East which have as yet not been completely opened up by modern technology. One of the essential aims of this work is to demonstrate these relationships.

Geographically Afghanistan is part of the Iranian-Turanian plateau. Geophysically, climatically and in terms of its human geography, the country's characteristics are similar to or the same as those of the Iranian Khorassan and Seistan, the Soviet central Asian republics and West Pakistan beyond the Sulaiman Range. It therefore follows that in epidemiological terms Afghanistan should be considered in context with its neighbouring territories rather than in isolation. Since literature in the field of epidemiology which treats of Afghanistan is scarce, it is necessary to consider the outcome of research from neighbouring countries and to draw conclusions concerning the epidemiological characteristics of Afghanistan from these, with the result that the hazard implicit in a dissociated study of that country can be readily avoided. Thus it is that our presentation is conjointly a contribution to the geography of diseases and the geomedicine of the areas of the Middle East bordering on Afghanistan.

In all essential points the description of the development of the country, of the present health services and the dynamics of epidemics corresponds with the present situation. Literature on the subject has in part been considered to take account of publications in the years 1966 and 1967, but it is possible, however, that during the writing details have already been overtaken by readily accessible mountains, it is quite possible that reports of localized outbreaks of disease never reach the health authorities in the capital. This is unavoidable and for such reasons statistical data on diseases can scarcely ever be regarded as wholly valid and the author is fully aware of the limitations implicit in utilization of such data. Nevertheless, they do provide a clue to the evaluation of the dynamics of diseases over the course of years, even if viewed critically, and in this manner and despite all the objections which must be raised, they are the expression of development. It is hoped that the recent division of the country into 29 provinces, in the place of 12 which have existed until now, will lead to speedier registration and action against outbreaks of epidemics which may possibly occur.

For a number of years Afghanistan has entered into development in the medical field which, in close cooperation with foreign and international institutions, is being systematically advanced. Anyone who has seen Afghanistan in the pre-war period and during the first years after the war and has revisited the country in recent years—that is, observed it over a period of almost three decades and cooperated in the development within the framework of tasks set him over a number of years—must acknowledge great progress. Combining the findings in the literature on the subject as well as the statistical data with his own experience and observations, and possessing a personal affection for land and people, he will be able to judge with the greatest objectivity possible not only the progress and development but also the limitations. To present this development, which in spite of unusually difficult circumstances conditioned by nature is continuously promoted, will be another aspect of this work.

For the reader who is unfamiliar with medical problems, the treatment of less well known diseases is preceded by a short explanation of the terms employed; as far as possible the Persian names of diseases as used in Kabul have also been added. Scientific names of plant and animal species have, however, only been mentioned where it appeared to be absolutely essential for the characterization of vegetation forms or parasitologically important animal species. Frequently, however,—and especially when the names of species did not seem to be adequately defined by special studies—the information remains confined to German and English names or to scientific generic names.

The spelling of place names in the maps has been

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The Afghan recording of time begins with Mohammed's flight from Mecca to Medina in the year 622 A. D.; since 1911 the solar year has also been recognised in Afghanistan and this starts on March 21st or 22nd. March 21st, 1964, was the first day of the Afghan year 1343. Numerical data valid for Afghan years has been supplemented by the figures for the corresponding period of the Gregorian calendar in brackets; thus the figure 1343 (1964/65) refers to the period from March 21st, 1964, to March 20th, 1965.

A. Land and People

The *history* of Afghanistan has, since ancient times, been marked by the military expeditions of numerous conquerors to whom the struggles for a few mountain passes which opened the way to India were the precondition for the foundation of their empires. The expeditions of the legendary Bactrian kings in the Iranian-Turanian area, of the Achaemenians advancing towards India by way of the "Ariana" as were the Greeks to do at a later stage under Alexander's leadership, the invasions of the Scythian peoples in the second century B. C. and those of the Yue-chi or Tochars arriving in Bactria from the east and pressing on from there to the south east—all of these events demonstrate how even in ancient times the Afghan territory was exposed to frequent conquests. The establishment of the Kushan Empire in the second century A. D., the inroads of the Hephthalites during the 5th and those of the Arabs during the 7th, 8th and 9th century and the numerous invasions of Sultan Mahmud of Ghazni into India as well as the expeditions of the Mongols under Jenghiz Khan in the 13th and under Timur Lang (Tamerlane) in the 15th century which led to appalling devastation, all continue the sequence of military struggles in the Afghan region. The time of the Mogul emperors, whose dynasty begins with Babur Shah, is marked by military disputes over the territory along the India-Bactria King's Road—echoing the saying that "he who wants to rule India must first be king of Kabul"—and it is not until modern times that quieter and more permanent conditions develop [2, 14, 24, 27, 51, 80, 103, 117, 135].

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1. Surface Formations

Afghanistan lies between 29° N and 38° N and 61° E and 72° E, comprising an area of about 650,000 square kilometres within its frontiers. In the east the country borders on the Pamir and in the north from Lake Victoria to Kham-i-Ab on the Amu Darya; the remaining boundaries towards the U.S.S.R. and Iran are largely open, running as they do across deserts and steppes impassable save for a very few routes; in the south and south east the border follows the Safed Koh and the Sulaiman Range. Thus Afghanistan is a landlocked state without access to the sea and was for a long time known as a closed area, maintaining links with the outside world only in the most recent times.

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Baba 3,588 m.); in the north between the Belchiragh and the Bala Murghab the *Band-i-Turkestan* (3,497 m.) extends in front of it. Another, smaller mountain range between Obeh and Dehzawar south of the Heri Rud is named the Safed Koh but should not be confused with the similarly-named mountains in the south east of the country. The height of all the mountains decreases progressively westward away from the Pamir to a height of about 2,000 m.

Originating from the main trunk of the Hindu Kush the ranges of the *Afghan Central Mountains* spread like a fan to the south west into the Hazarajat, and they too continue to lose height from east to west until they finally dip below the recent deposits of the Seistan Basin [95] at a height of 500 to 600 m.

Between the chains of mountains lie *river valleys* (Plate 3 a—d) which are at times deeply incised and filled by unconsolidated gravel; in many of these are situated fertile cultivated areas. Because of their recently formed and in some parts loessial soils, the *basins* of Jalalabad (622 m.) and Kabul (1,803 m.) as well as the *plateaux* of Ghazni (2,220 m.) and Kandahar (1,044 m.) provide equally good opportunities for cultivation.

In the south of the country and surrounded by barren mountains lies the hot *Seistan Basin* with an average altitude of 500 m. [95, 138, 141]. It measures some 18,000 square kilometres and extends into Iran. This basin probably constituted one of the oldest areas of cultivation and settlement in the country but the devastations of the Mongol period destroyed practically all the opportunities for cultivation, leaving the area thinly populated to the present day. The *Dasht-i-Margo* and the *Registan* are complete deserts, divided from each other by the Helmand valley. Only at the present time the re-establishment of the ancient fruit oasis in the district of the Helmand river below Girishk has been started.

North of the Hindu Kush the country falls away to the in the main very fertile *Bactric* cultivation zones and the extensive *Turkestan steppes*. With an elevation of 3—400 m. (Kham-i-Ab 277 m.) they form the lowest areas of the country and continue in the similar Soviet areas beyond the Amu Darya.

The Heri Rud valley forms a marked agricultural area, opening as it does to the west whilst at the same time being protected from the dessicating north winds by the mountain chains of the Paropamisus which run in an east to west direction.

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In the *Wakhan Mountains*, which are situated between the Pamir and Karakorum and run in a N. E. to S. W. direction, slates, gneisses and quartzites are the predominant rocks, while in western Badakhshan the mountains consist mainly of semi-metamorphic rocks of Palaeozoic and Mesozoic age as well as of gneisses and intrusiva [13, 21, 22]. Throughout the entire *Hindu Kush* crystalline slates, gneisses and intrusiva seem to predominate along with Palaeozoic and Mesozoic metamorphic elements; in the Koh-i-Baba, Safed Koh, Paropamisus and other western extensions too, cores of crystalline and semi-metamorphic as well as unmetamorphosed Palaeozoic rocks are to be found. These are, however, mantled in part or whole by Mesozoic or Tertiary sediments [17, 30 a, 38, 45, 48 a, 54, 95, 118, 141]; (Plate 1 a—d; 3 d).

North of the *Hindu Kush* in Afghanistan it is generally possible to distinguish three geological units: the northern flank of the Hindu Kush with folded Palaeozoic and Mesozoic strata, then the tectonically little disturbed Mesozoic and Tertiary mountainous foreland of the Hindu Kush the strata of which are tilted only near the mountain basement as a result of overthrusting, and finally the northern Afghan belt of steppes and deserts where gravel, sands, loess and loess-loam of great thickness shroud the older rocks beneath. Loess deposits on the edge of the foothills in particular form agricultural lands of good fertility [40 a, 52, 56 a, 63, 70 a, 84, 153].

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younger clastic rocks. Several intermontane basins—as for example Khost and Yakubie—are filled with Quaternary clays, loess, loess-loam and terraced gravels and form good agricultural areas [43, 44, 67, 68, 69].

The western limitation of the south east Afghanistan geosyncline is formed by the Chaman-Mukur tectonically active zone, a rift valley several hundred kilometres long which is also filled by young clastic strata; in the north it is bounded by upper Palaeozoic and Mesozoic sediments as well as by the peridotites of the Kabul mountains. Towards the east the metamorphic rocks of the Siah Koh and Safed Koh link up. During the Plio-/Pleistocene intermontane basins of great extent accumulated terrestrial sediments, clayey and silty lake deposits as well as sands and gravels and in the Jalalabad Basin, for instance, these attain a thickness of c. 1,000 m.

Tectonic earthquakes occur frequently in Afghanistan. They probably originate from an epicentre far beneath the Hindu Kush (128); to date it has not been established whether and to what extent local earthquakes have their origin in the Afghan-Pakistan border ranges.

Mineral resources appear to be more abundant than has hitherto been accepted. Jurassic coal occurs on the northern side of the Hindu Kush, and mineral oil and natural gas have been discovered in the Bactrian plains. In addition to these, copper, lead, zinc, and chromium ore as well as sulphur, talc, several precious and semi-precious stones—among which beryl, rubies, and lapis lazuli predominate—have been found. In the region of Mukur remarkable gold lodes have recently been reported. It remains to be seen to what extent mining of iron ore, which has already been started, will prove successful, as some deposits are of high content but, unfortunately, sulphurous. Furthermore, rock salt is being mined for domestic consumption in Taluquan [26, 75, 104, 106, 107, 115 *inter alia*].

3. Afghan Mineral Springs

In this country which offers such orographic and geological variety a great number of *mineral springs* are mentioned incidentally in the reports of individual travellers, but they are not supported by many exact analyses [33, 34]. Many of the springs are, however, considered to be therapeutic and even in present times a spring is linked with the *siarat*, the grave of a saint related to it by saga or legend. It nearly always happens that sick people seek to increase the effect of the water rising from the depths by their prayers or invocations—a form of balneo-therapy which is deeply rooted in theurgy. There are no definite indications of the use and application of individual springs, nor are there any plans for the course of treatments. Many waters which are probably completely indifferent are applied against the most diverse diseases but, despite the most primitive

fruit-growing area. The bare slopes of the stream valley are covered by limestone detritus and in the background soars the practically 3,600 metres high granite wall of the Paropamisus. A simple spa installation with spa hall, *Siarat* and bath house (Plate 5 d) which contains several bath tubs in individual cabins, has already been in use for years. A small hotel building serves to lodge guests of the spa. The temperature of the water is 41.3° C. and we found the flow to be at about 200 litres a minute. The analysis made by Hauser [34] furnishes the following values:

solid matter in solution		390.44 mg/Ltr
dry residuum (105° C.)		367.00 mg/Ltr
pH (glass electrode)		9.07

1 litre of water contains		mg	millival
H_2SiO_3		12.4	
$Al(OH)_3$		8.3	
		20.7	
Kations	$Fe^{..}$	3.5	0.13
	$Ca^{..}$	28.2	1.41
	$Mg^{..}$	11.5	0.94
	$K^{.}$	9.04	0.23
	$Na^{.}$	57.8	2.51
		130.74	5.22
Anions	Cl^{-}	23.3	0.66
	So_4^{--}	153.0	3.19
	HPO_4^{--}	Trace	Trace
	HCO_3^{-}	83.4	1.37
		390.44	5.22

Not verifiable: NH_4, NO_3, H_2S, As and free CO_2

Thus this is an acrato-thermal spring which, since the temperature of the water lies almost 30° C. above the mean annual air temperature (11—12° C. at 1,750 m.), probably rises from greater depth—i. e. from the lower granite strata of the Paropamisus. It is worth noticing that the Heri Rud valley lies over a line of disturbance which runs from west to east, south of the Paropamisus, in the course of which further hot springs are said to occur [141]. Therapeutically the spring appears to be valuable in cases of chronic rheumatic illness, but it is a pity that so little use is made of it and that medical supervision is also lacking.

A fundamentally different type of spring is represented by the *CO_2-calcareous springs* of the Afghan central mountains, some of which we have investigated. They are distinguished by their content of alkaline earths, hydrocarbons, sodium chloride and free CO_2, as well as by the deposits of extensive carbonate sinter, the formation of which is favoured by high evaporation [62, 78 a, 91, 126]. The *dragon spring at Istalif*, about 40 kilometres north of Kabul, emerges at the foot of the Paghman mountains and has led to the formation of a typical stony channel (Plates 3 a and d). On the other hand, the *dragon spring at Bamyan* (Plate 4 b) has flowed out of

into two parts by a deep cleft, the valleyward one of which has sagged away markedly from the other. The analysis we give as the sole example of such sinter springs was carried out by HAUSER [34] in the course of investigations undertaken together in the years 1951 to 1952:

solid matter in solution	3370.1 mg/Ltr
dry residuum (105° C.)	2177.0 mg/Ltr
pH	6.54
conductivity	390 Ohm

1 liter of water contains		mg	millival
H_2SiO_3		33.8	—
$Al(OH)_3$		18.3	—
		52.1	—
Kations	$Fe^{..}$	5.6	0.20
	$Ca^{..}$	655.0	32.68
	$Mg^{..}$	64.8	5.33
	$K^{.}$	16.7	0.43
	$Na^{.}$	73.7	3.20
		867.9	41.84
Anions	Cl^{-}	40.2	1.13
	SO_4^{--}	80.5	1.67
	HPO_4^{--}	1.5	0.03
	HCO_3^{-}	2,380.0	39.01
		3,370.1	41.84
Free CO_2		4,620.0	
		7,990.1	

Not verifiable: NH_4, NO_3, H_2S, As, Mn.

The temperatures of these and some similar springs were between 19.0 and 25.0° C., and several of these springs appear to lie—like the Obeh spring—in the vicinity of the large west/east disturbance line. It must be admitted that the springs of the Ghorband valley obviously flow from older rock strata than those of the dragon spring at Bamian. Presumably there is an extensive system of homogeneous or at least similar mineral springs in the central Afghan mountain country, to which the dragon spring at the Shatu Pass (Plate 4 c), the springs at the Hajigak and Unai Passes and possibly even the Bend-e-Amir lakes, belong.

Sulphur springs are known as well, although they have not as yet been investigated. Whether and in how far the springs can be of medical importance would have to be cleared up by further hydrological, geological and balneological investigations. Above all it appears that it is the low discharge rate of most springs that seems to impede their effective utilization [33, 34].

4. Hydrology

Afghanistan's *rivers* are almost wholly untamed mountain streams which discharge highly changeable amounts of water. With scarcely any exception they are the inland rivers of an areic plateau, partly (Amu Darya, Helmand) flowing into inland lakes, but largenorthern and southern province by the western Hindu Kush and the Koh-i-Baba [95, 127, 130].

The *discharge* is subject to marked seasonal fluctuations dependent on precipitation and the thawing of snow in the mountains. Many rivers which form torrential mountain rivers during the thaw or rainy season are no more than tiny streamlets during the dry season or may dry up completely. During the summer months the numerous dry river beds are part of the scene on the arid plateau. The water courses which make their way from the Koh-i-Baba to the north already reach their peak in the spring whereas the Amu Darya, coming from the Pamir, only attains its peak in July or August. In the course of the year the flow of water in the Helmand at Girishk fluctuated between 90 and 4,000 m³/sec., the extremes being at 60 and 20,000 m³/sec.; that of the river Balkh at Chishma-i-Shefa (Plate 3 a) between 20 and 30 m³/sec. in December and 750 m³/sec. in spring; the Kabul river in its middle course below the city of Kabul ranged between 73.4 m³/sec. in January and 425 m³/sec. in April; the mean water flow of the Amu Darya at Kham-i-Ab amounts to about 1,740—2,000 m³/sec. [40, 127, 130].

The *velocities of flow* also vary greatly and can therefore not be evaluated quantitatively. All rivers start out as mountain streams rushing downhill at great speed, and even when they pass through the lower lying fruit-growing districts they still flow very fast—a fact which can be of epidemiological importance. *Endemic* cholera does not develop in plateau areas with fast flowing mountain rivers—i. e. rivers with effective self-purification—but only in areas with sluggish or stagnant waters, as in the lower Ganges region. So it is that in Afghanistan it is not the wild rivers but rather the slow moving irrigation channels which have been proved to favour the spread of epidemic cholera outbreaks at times (see page 109).

The most important rivers of the country are the following: the Amu Darya which acts as a frontier for a length of 800 km. in the north and is a typical lowland river even before it is joined by the Surkh-Ab (Waksh); the Helmand (1,000 km.) which, after leaving the mountain region, runs across the southern desert area towards the swamp lakes (Hamum-i-Sabori and Hamum-i-Pusak), the water of which has recently been made available for agriculture by modern irrigation plants situated below Girishk (see page 83); next there is the Heri Rud (850 km.) which waters the broad fruit-growing valley east of Herat but then disappears in the Tedjend Oasis at a later stage; the Kabul river (460 km.) with its tributaries the Panjshir, Kunar (Plate 3 c) and Logar, joins the Indus at Logar. The rivers which flow from the Hindu Kush and Koh-i-Baba to the north are the Koksha, Kunduz, Balkh and Murghab, of which only the two former ones reach the Amu Darya [95, 127].

The few *lakes* of the country—Lake Victoria, Lake Shiwa, the swamp lakes in the area at the mouth of the

in most cases had been determined by nature. These routes follow river valleys, linking the cultivated oases within the steppe and desert areas with one another and across the big mountain ranges at the most favourable high level passes. The Ak Robat (3,127 m.), Shibar (2,987 m.), Salang (3,880 m.), Anjuman (4,225 m.) and Khawak (3,550 m.) are some of the most important passes across the Hindu Kush, connecting the south of the country with the Bactrian areas; during the winter months, however, they are covered by snow and impassable. They are the very same passes which were used by the armies of conquerors in ancient times and on the India-Bactria King's Road leading from Delhi to Kabul, Bamyan and the Ak Robat Pass to the north and of whose earlier importance the traveller is still reminded by the ruins of stupas (117), the traffic between India and Turkestan took place over many centuries. Coming from the east and also running across Bactria or Bamyan, the southern branch of the Silk Road runs through the country. Bamyan, the Graeco-Buddhist cultural centre, also acted as a crossing point of caravan routes which led from the south to the north and east to the west [113, 117].

The introduction of modern vehicles resulted in the necessity of constructing roads [113] with a gentler gradient than had been the case with the old caravan routes. So too the great ring of roads from Kabul through the Ghorband valley to the north via Mazar-i-Sharif, Herat, Kandahar, Ghazni and back to Kabul follows in the main the ancient carvan routes [18, 94, 95], and at the Shibar Pass it crosses the western outliers of the Hindu Kush at an altitude of 2,987 m. Together with its branches to Kunduz, Khanabad and Faizabad to Meshed, Quetta, Gardez and Khost and across the Lataband to Peshawar, for a long time it acted as the only network of roads in the entire country capable of taking motor traffic. Even nowadays practically all goods traffic and the greater part of passenger transport is conducted by lorries and motorbuses on these roads. The roads had neither foundations nor solid cappings (Plate 5 a) and in winter were scarcely passable, whilst in summer to drive along tracks on the open steppe was often more comfortable than to keep to the road. Even today the direct link from Kabul across the Hazarajat to Herat, which follows the old caravan route from Bamyan to Khorassan, can only be used with difficulty.

Over recent years, however, together with the continual increase in motor traffic in a country without railways, shorter and technically much improved roads have been constructed, largely with American and Soviet aid. The new road from Jalalabad across the Tenge-Gharu to Kabul (Plate 5 b), the highway over the Salang Pass with a tunnel at a height of 3,000 m. (Plate 5 c) and the short-cut from Shindand to Dilaram on the Herat—Kandahar section all represent substantial re-alignments

are ferry services operated with the aid of shallow-draught boats or rafts buoyed up by inflated animal skins in a manner common to western Asia since antiquity (Plate 3 c).

The first beginnings of *air traffic* between Europe and Kabul go back to the initiative of the German Lufthansa in the Thirties. Today Kabul is connected to the international air network and has its own air transport company known as "Ariana" which is concerned not only with inland traffic to Kandahar, Herat and Mazar-i-Sharif but also with part of the services to overseas countries.

As *disease routeways* the roads have been of importance in ancient as well as in modern times, and if diseases moved with caravans then they may quite conceivably travel and spread much faster with the modern means of communications. Kabul has its own air-medical service available. During the season of pilgrim flights to Mecca which depart from the new Kandahar airport, a medical disease-prevention service is maintained there both to check-out the numerous pilgrims and to provide the necessary vaccinations.

6. Natural Regions

The geological and geographical survey which has been presented so far may already have indicated the division of the Afghan area into several *natural regions* which will emerge more distinctly at a later stage when seen in connection with climate and vegetation; not only is it possible to assess them differently in terms of settlement, cultivation and stock raising but also in respect of their epidemiological characteristics.

They may be grouped as:

1) The Turkestan Lowland, with elevations between 300 and 1,200 metres (Andkhoi 330 m., Faizabad 1,204 m.), filled with late Quaternary sediments of great thickness and consisting largely of steppe together with some fertile areas under cultivation which owe their origin to considerable deposits of loess on the margin of the foothills.

2) The central and high alpine mountain region, lying at over 2,500 metres and supporting little vegetation, which demands an epidemiological assessment which is essentially different from that required for the lowland.

3) The desert region of the Dasht-i-Margo and Registan (500—1,100 m.) in the south of the country which is traversed by the Helmand and extends in the north to an east-west line roughly linking Girishk and Farah.

4) A steppe and semi-desert region between the central mountain region and deserts, attaining altitudes between 900 and 1,800 metres in the west and 1,200 and 2,600 metres in the east. This region penetrates deeply into the mountain massifs along the valleys and runs in a great bow from Kabul to Kandahar which extends

soil structure have the effect in a comparatively small area of producing highly differentiated climates, which range from desert and steppe climate to the alpine climate of high mountain regions, which exist side by side [1, 60, 95 *inter alia*]. Older measurements, which relate mostly to particular places or to short periods only [62, 129, 136, 273] result in fragmentary representation and it is only in more recent times that records of measurements taken in 16 different stations of the country over a period of several years have become available and grant sufficient perspective [55].

1. Temperatures

In Table I the monthly mean temperatures, as measured at the Afghan stations, have been brought together [55]. On the one hand the table shows the significantly higher temperatures in all lower-lying places (Herat 922 m., Mazar-i-Sharif 377 m., Farah 651 m., Jalalabad 622 m.) by comparison with stations at high altitudes (Kabul 1,803 m., Ghazni 2,222 m.); on the other hand, however, the mean summer temperatures of the low-lying Afghan stations are mostly higher than those of comparable places in West Pakistan and India (Fig. 1 a and b).

recognition of a much more differentiated grouping into cold and warm seasons—i. e. periods of rest and vegetative growth in the arid highlands—than is the case south of the border mountains. It is only the movement of temperature at Peshawar which represents a type intermediate between those of the highland and the Indian lowland. In the Turkestan steppe area short periods of frost were observed in December and January; in the highlands above 1,500 metres the winter months are at times also accompanied by continuous frost, whilst in the alpine high mountain regions frost periods may well last 5 to 8 months.

Day and night temperature fluctuations as represented in Table II for Kabul and Kandahar, are likewise remarkable and characteristic of the Afghan climate. They are greatest during periods of cloudless weather in the summer and autumn months, particularly when the nights grow longer in late summer and early autumn and there is a corresponding increase in radiation; they are less during the cyclonic periods of winter and spring when the skies are clouded. *Thermoisopleths* for Kabul and Herat have been compiled for the first time by Reiner [114] and we are indebted to him for Figs. 2 and 3 (reverse of *Map No 1)* which demonstrate the strong contrasts in temperature movements.

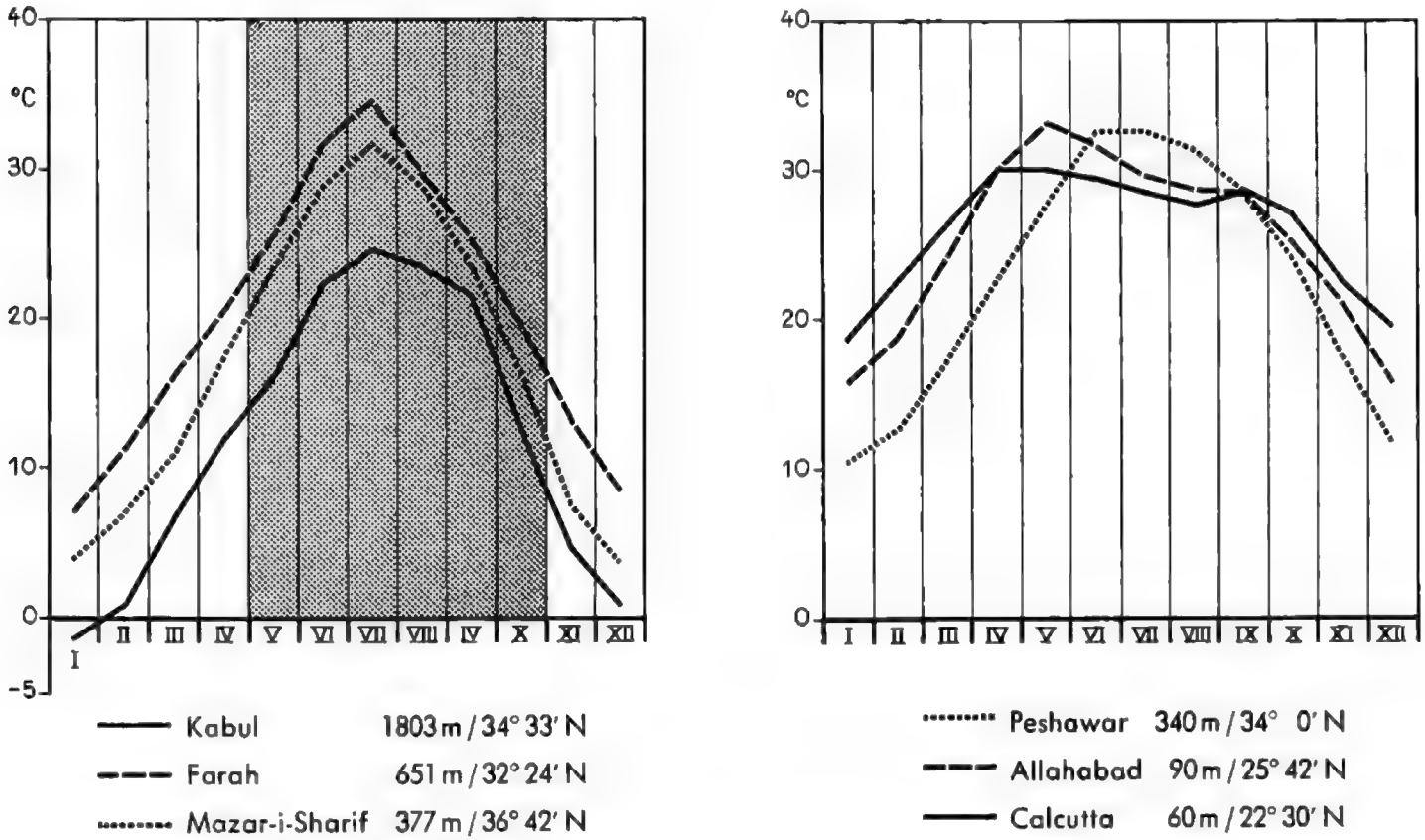

Fig. 1 and b. *Mean monthly temperatures in Afghanistan, compared with data from stations in West-Pakistan and India.* [Compiled from Herman (55), Stenz (129), Tables of Temperature (136), Walter (151), Hann: Handb. d. Klimakunde and Köppen: Grundr. d. Klimakunde]

a) Mean monthly temperatures in Kabul, Farah and Mazar-i-Sharif; pronounced annual deviations, seasonal climate with marked resting and vegetation periods. Dry season from May

b) Slight deviations in the annual course of temperature in Calcutta and Allahabad; more pronounced deviations in Peshawar. The three places have no common dry season.

pleasant seasons of recovery for the European in Kabul, even if they are all too short.

2. Precipitation

The greater part of the country *lacks rain*. In the lower-lying desert and steppe areas of the south (Farah, Lashkargah), as well as in the eastern lowland (Jalalabad), rainfall amounts to less than 200 mm. The north (Maimana, Kunduz) enjoys somewhat higher amounts which provide more favourable conditions for cultivation, but even in the highland of Kabul and Ghazni the annual amount of precipitation remains below 500 mm. Only the stations in the high mountains of the Hindu Kush (Salang) report precipitation of more than 1,000 mm. (Table III). At high altitudes large amounts of snow fall during the winter months and these form the true water reservoirs of the rivers. It is scarcely ever that even small, passing snowfalls are observed below 1,400 m. and the permanent snow line lies at about 4,500 m.

The *rainy season* usually starts suddenly and is fairly well defined in time, the number of rain days being but small. Kabul has 58 whereas Paghman, owing to local weather disturbances, has 83. Girishk by contrast has only 24 and Herat 34, so that the rainy season in Afghanistan is not to be compared with the tropical rainy season of India.

In the western parts of the country (Fig. 4 a, Kandahar, reverse of *Map No 2)* which are similar to the Iranian and Mediterranean climatic zones, the main quantity of rain falls in winter; in Kabul, which lies further to the north, as well as in the eastern provinces (Fig. 4 b and c) spring is the actual rainy season. Summer and autumn however, are almost or in some cases wholly free of rain nearly everywhere in the country; the dry season lasts from April of May until late autumn and in some places through to December (Table III and Fig. 1 a), and it is of epidemiological significance in the spread of certain infections and particularly so for the development of breeding-places of anopheline mosquitoes in river beds which have by then largely dried out. Only Khost, situated in the vicinity of the Pakistani border below forested mountains, which is clearly affected by the influence of monsoons, and the high stations (Salang) of the Hindu Kush also record rainfall in summer. By far the greater part of the country belongs to the arid climatic zone whilst the high parts fall into the semi-arid.

3. Radiation, Humidity and Evaporation

Afghanistan is one of those areas having strong *global radiation* (sky and solar radiation), the value of which stands at 140 for the Turkestan lowland, at 160 for the central Afghan mountain country and at 180 Kcal/cm² for the south [77]. The duration of solar radiation is equally unusual, and to the visitor in the

The annual range of mean values is about 50% in Kandahar (73% in January, 23% in October) and about 34% in Kabul (77% in January, 43% in July). Diurnal fluctuations can, however, be great at times [62]: extreme values below 5% minimum and 95% maximum in the course of a single day have been recorded by us in Sarobi. Thus temporary sultriness at correspondingly high temperatures occurs frequently, especially at the lower altitudes.

It would appear to be obvious that *evaporation* is unusually high under such circumstances. Stenz [126] has recorded an annual evaporation of 2,305 mm. in Kabul and Iven [62] even measured 3,031 mm. Both values, despite their wide divergence, confirm that evaporation is many times greater than precipitation, a factor which explains the unusual water losses of the rivers which is further increased by diverting large amounts of water for the irrigation of cultivated lands.

4. Winds

Only in the east and south east of the country are the winds essentially determined by the influence of the monsoons. Dry trade winds—as for example "the 120 day wind" so often described by travellers—occur in the north and north west of the country during the summer months. They bear dust and heat along with them and as the air masses heat up strongly over the hot basin regions a sojourn in Seistan becomes intolerable in the summer. North westerly katabatic winds dominate in Kabul during the summer, developing mainly in the afternoon and cause a heavy build-up of dust. As a result of the inflow of arctic air masses in the winter, localized and bitingly cold north and north easterly winds prevail whilst in the remainder of the country the north westerlies predominate. For further details of barometric fluctuations, cloudiness, and air currents cf. Herman [55].

5. Natural Climatic Zones

The climatological data given so far, together with the geographical description of the country enable us to discern in this connection, individual climatic zones [129, 150, 151]. An attempt to incorporate the vegetation conditions in this system and thus, in a manner similar to Bobek's work on Iran [8], to develop "bioclimatic zones", has been made by Volk [147]. Map number 2 a shows the climatic zones which have been worked out by him which are largely in accordance with geographical-geological regions.

The *Bactrian* and *Turkestan lowland* which is situated to the north of the Hindu Kush, only benefits from rains of short duration in winter and spring which fall for the main part before the beginning of the vegetative period. It has north westerly winds in winter, only short periods of frost and hot, dry summers.

however, the area is almost unbearably hot owing to the winds which flow down from the north.

The *transition zone*, itself determined by geographical circumstances, is an area of steppe and semi-desert between the *garmsir* and central mountains. It continues to experience something of the summer monsoon influence in the east, but enjoys only scant precipitation which falls predominantly as spring rains in the east of the area, whereas in the west where Mediterranean influences are still effective they are winter rains. The lower altitudes have no continuously frosty periods but the higher areas show well defined winters.

Eastern parts of the country, including the subtropical fruit-growing Jalalabad basin as well as the border mountains, are, however, strongly affected by the monsoon. The lowland basins are very hot in summer, frost-free in winter and are equally as useful for winter grazing. Summer rains also fall in the mountains and because of these climatic singularities extensive forest areas have been able to develop.

6. Climato-Physiological Effects

As a rule foreigners living in Afghanistan can tolerate its arid climate very well, and the marked distinctiveness of the seasons and the sensible temperature drops at higher altitudes are in particular considered to be pleasant. In the beginning when one stops in the highland some shortness of breath may be experienced at times, but this is a result of the low oxygen pressure and the organism quickly adapts to it.

Heat stress [20] is comparatively limited in the highland. At the altitude of Kabul and higher up a marked feeling of sultriness in the hot summertime and especially at the noonday and afternoon hours is rare and of a passing nature; as a rule the threshold of absolute humidity (i. e. a vapour pressure of 14.08) is only rarely attained in the highland. In the lower areas of the country, as for instance at Kandahar, the humidity threshold is exceeded much more frequently and in Jalalabad and in the *garmsir* of the south the summer months are accompanied by continuously high vapour pressure values, which, because of the inadequate evaporation of perspiration, cause a sultriness which is extremely taxing. At lower altitudes when temperatures rise considerably above 32° C., the winds are no longer cool and refreshing but hot, with the result that during the summer months the stress conditioned by the climate in the northern, southern and eastern provinces can be important. Only those persons who possess a very sound circulation should be selected for summer residence in hot regions, particularly if the daily work is connected with heavy physical exertion. Figures 4 a—c (reverse of Map 2) for the compilation of which we are indebted to K. Daubert (Bioclimatic Research Centre, Tübingen), show the climato-physiological peculiarities mentioned above and compare those of Kandahar, Kabul and

shown that the flora of the country is much more abundant than had previously been supposed. Above all a marked dependence of plant communities on soil, climate and altitude has been established and in the mountain regions particularly, a horizontal division of the vegetation similar to that in the Himalaya [121] is clearly to be recognized [92, 93, 146]. As in the animal kingdom, so too in the vegetation Mediterranean influences—and in the hot areas tropical Indian traits—are recognizable [48, 95]. The ensuing sketch of individual vegetation zones is based essentially on the bioclimatic zones put forward by Volk [147] (vide Maps 2 a and b), but naturally it does not present an exhaustive description of the plant associations *.

In the north of the country, that is in *Afghan Turkestan*, the *Salix*, *Populus* and *Tamarix* species, together with saxaul bushes and, among the grasses, the high *Erianthus* species predominate in the zone along the banks of the Amu Darya [93]. In the steppe-like plain south of the river, the soil of which consists in the main of the finest loess, only the spread of plants with a short development period is possible because of the brief period of winter rains. Cornfield-like stands of therophytes *(Aegylops, Lepturus, Hordeum,* crucifers, composites) mixed with geophytes (e. g. *Carex pachystylis)* are characteristic. Spring brings a short period of splendid greening and flowering, but thereafter there is the impression of the dry, brown, steppe landscape which remains fundamentally indistinguishable from the Soviet steppes north of the Amu Darya. Along the mountain edges are found stands of *Pistacea vera* trees as well as extensive stands of artemisia, whilst on the edges of irrigation channels and river banks there are *Erianthus* species *(Erianthus ravennae;* vide Plate 6 d).

The central mountains have an arid highland climate with relatively long winters. They thus possess conditions for the development of vegetation which are different and display various relationships with the flora of High Asia. Tall plants recede markedly and the *Eurotia-Artemisia* associations as well as thorny cushion plants, poor in leaves, such as *Acantholimum erinaceum* (Plate 6 b) and species of *Acanthophyllum* which form the so-called "hedgehog steppe" are characteristic. Apart from these, there are species of ephedra, festuca grasses, perennials and camel thorn *(Alhagi maurorum)* as well as tragacanth bushes, *Juniperus nana* and on the northern slopes of the Hindu Kush even tree junipers *(Juniperus seravschanica;* Plate 7 a).

The southern desert area of the *garmsir* present quite a different picture. On the cuesta of the contiguous mountains can still be found artemisia steppes and ephedra stands; Neubauer [93], moreover, mentions, *inter alia, Pistacea cabulica*, lonicera, cotoneaster and *Prunus eburnus*. In late summer south of Girishk we saw extensive and splendidly flowering stands of violet *Halarchon vesiculosus* (Chenopodiaceae). In addition large stretches of halophyte flora, probably resembling

In the transitional zone—the steppe and semi-desert region with altitudes of 900—1,800 m. in the west and 1,200—2,600 m. in the east—artemisia associations are characteristic in many places and they are accompanied by cousinia, *Amygdalus nana, Melica cupani, Aristida cyanantha, Rheum ribes, Carex pachystylis* as well as species of eremurus, iris and tulip. *Pistacea cabulica, Amygdalus communis* and sparse rose bushes are also cited; near Istalif on the eastern slopes of the Paghman mountains there are stands of *Cercis griffithii* (Judas tree, *arghowan)* which are well known to most foreigners living in Kabul. On the whole it is a steppe vegetation, closely related to that of eastern Iran, which spreads along a broad front from Khorassan to the east [147].

Larger blocks of forest are only found south of the Hindu Kush in eastern and south eastern Afghanistan which comes under in influence of the summer monsoon. The dependence of forest formations on altitude is self-evident [60, 72, 92, 146]. At lower and middle altitudes *Olea cuspidata, Zyzyphus* and *Reptonia* are found; the zone of evergreen hard-leaved forest extends from 900 to 2,200 m. and it is a mixed wood zone in which *Quercus baloot* predominates. Above that up to a height of about 3,000 m. *Pinus griffithii, P. gerardini*—in moist places even *P. excelsa*—but above all Himalayan cedars *(Cedrus deodora,* Plate 7 b) form extensive coniferous forests which are regarded as being the south western extensions of the Himalayan forests [92, 111]. There are scarcely any completely untouched forests left in Afghanistan and in the case of the entire south eastern forest area of the Sulaiman Mountains in particular the forest is being used by the timber industry and has been markedly cleared in many places. The Afghan government, helped chiefly by German aid, has already begun the necessary preliminary work on maintenance and reafforestation of the woodlands, particularly in the Pactia Province.

The *Jalalabad lowland* already presents a largely sub-tropical flora which differs greatly from the Iranian-Turanian vegetation realm of the remainder of the country. Volk [147] mentions *Acacia modesta, Dahlbergia, Chamaerops ritcheana* and *Carualluma.* We observed *Callotropis procera* (Asclepiadeaceae, Plate 6 c) in abundance on the road from Sarobi to Jalalabad and even sugar cane cultivation is possible in this area; not only did we find *Saccharum spontaneum* (Plate 6 a) here but also noticed it in damp localities in the vicinity of Girishk. The steppes of the eastern and south eastern region up to a height of about 1,200 m. are equally marked by elements of the palaeo-tropical flora.

In summary the picture of vegetation that emerges is that peculiar to the arid countries of western and central Asia. It would appear that in the field of vegetation Afghanistan makes up a far-reaching uniformity with the remaining countries of the Iranian-Turanian area. This is also brought out in *Map No 2 b.* The south

Atropa acuminata, Bryonia (cucurbitaceae), *Cannabis indica* (hashish), coloquinth, *Datura strammonium, Ephedra, Ferula* (Asa foetida; *hing*—which is still exported to India), *Foeniculum vulgare, Glycyrrhiza glabra* (Radix liquiritiae), *Hyoscyamus reticulata, H. muticus, Papaver somniferum, Paganum harmala, Punica granatum* (pomegranate, *anar), Rheum ribes* and tragacanth species.

For further details on the systematics and ecology of Afghan plant communities the reader is referred to: Bornmüller [10], Griffith [48], Haeckl and Troll [49], Kerstan [72], Køje and Rechinger [76] and Neubauer [93].

2. Zoo-geographical Survey

In the ensuing section only the most important representatives of the relatively numerous species of wild life in the Afghan area, in which Mediterranean palaeo-arctic species encounter Indian and Ethiopian sorts, are mentioned [60, 95, 155].

In the course of time big game have been progressively driven back into the remote mountain areas. It would appear that bears were seen in the wooded mountains of Nuristan only a few years back [140], and the Siberian tiger is said to have lived in the area of the upper Amu Darya until quite recently [112]. So too, leopards have withdrawn more and more to inaccessible mountain regions. Wild asses are possible still living here and there in the south west of the country. During the cold winters of the late Thirties and early Forties we saw wolves venturing even as far as the immediate vicinity of the Kabul suburbs. Evidence of trichinosis in the wolf *(Canis lupus),* swamp lynx *(Felis chaus),* the jackal *(Canis aureus)* and the red fox *(Vulpes vulpes)* may be of medical interest [343, 344, 345], and in this connection the existence of wild pigs should be mentioned. For further details on trichinosis in Afghanistan vide page 126.

Wild sheep are said only to have been sighted in the Wakhan Mountains, but Asiatic mouflons have also been seen in the central mountain ranges [60]. Amongst the game animals gazelles and ibex inhabit the steppes and mountains. Camels no longer belong to the wild fauna, although it should be mentioned that the home of the Bactrian camel lies in the north and that of the dromedary to the south of the Hindu Kush, so that the mountains form the faunal boundary between the two species. Monkeys as representatives of the the Indian fauna are known only in the south east of the country, i. e. south of the Hindu Kush.

Among the *small mammals* the insectivora, lagomorpha, chiroptera and above all the numerous rodents which live for the main part below ground should be mentioned [85, 96]. In particular the *Rhombomys opimus* Licht (Gerbillidae), which lives in the northern

in the 1930's, but they have moved further and further away as the town has been extended in recent years; in fact we encountered none in 1964. The great bearded vulture is said to occur in remote mountain areas, as for example in the Urgun region, to this day. Nothing has yet been established on the subject of ornithoses and their transmission to man. For further details on ornithological findings in Afghanistan the reader is referred to WHISTLER [154].

Reptiles are represented by many species. Monitor lizards of considerable size at times are known in the Kabul area as well as in Sarobi and Jalalabad and several species of agamidae appear to be widely spread in the country [124]. As yet no systematic studies of Afghanistan's snakes have been published. Cobras have been sighted frequently at lower altitudes near such places as Jalalabad, Sarobi and Pol-i-Khumri as well as in the environs of Kabul. There are, however, no details on membership of particular species. *Coluber ravergieri* and *Natrix tessellata* have been found by SMITH [124]. Snakebites have not been observed by myself in Kabul, but in the countryside they are more frequent, even at times lethal since anti-toxic sera are generally not to hand.

Those species of arthropods which do occur are unusually numerous. Scorpions are found practically throughout the country, the most frequent species being those of *Buthus caucasicus. Buthotus alticola* and species of Priomurus have also been described [41, 123, 152]. It is seldom that patients suffering from scorpion bites come to the surgery—either they are treated by native means or not at all. Death as a consequence of a scorpion bite has not come to my knowledge. Sun-scorpions (Solpugae) have frequently been seen but proof of the existence of tarantulas in Afghanistan appears never to have been clearly established.

In 1962 an expedition from the Landesmuseum in Karlsruhe made a comprehensive collection of Afghan species of Rethera, Heteoptera, Blattaria, Tabanidae, Formacidae and other insects. Hyalomma ticks (Ixodidae) are almost without exception parasitic upon domestic animals, camels and wild rodents [3, 4, 71]. For the relationship between relapsing fever and those Ornithodorus species which occur see page 106. Anopheline mosquitoes, sandflies (Psychodidae) as well as helminths and protozoa will be considered in connection with those diseases transmitted or caused by them.

IV. The Population of Afghanistan

1. Density of Population

Data on the numbers of inhabitants of the country range between 12 and 15 million. In 1956 and 1960, the number of people including nomads was estimated to be about 12.5 million [60, 100, 155]. The Afghan

1. Kabul (1,177; Kabul 425); 2. Logar (284; Baraki Rajan 46); 3. Nangarhar (752; Jalalabad 45); 4. Kunar (303; Chigha Serail, in future Assadabad 26); 5. Laghman (204; Meterlam 67); 6. Kapisa (317; Tagab 65, in future Sarobi); 7. Parwan (815; Charikar 84); 8. Badakhshan (317; Faizabad 58); 9. Takhar (454; Taluqan 61); 10. Kunduz (373; Kunduz 74); 11. Baghlan (573; Baghlan 92); 12. Samangan (190; Aibak 35); 13. Balkh (325; Mazar-i-Sharif 40); 14. Jawzjan (396; Shiberghan 50); 15. Faryab (399; Maimana 51); 16. Badghis (294; Qala-i-Nao 70); 17. Herat (630; Herat 66); 18. Ghor (297; Chakhcharan 56); 19. Bamyan (318; Bamyan 44); 20. Wardak (382; Maidan 50); 21. Paktia (551; Gardez 36); 22. Ghazni (718; Ghazni 40); 23. Urozgan (475; Urozgan 43); 24. Farah (289; Farah 26); 25. Chakhansour (nowadays Nimruz 112; Kang, nowadays Zaranj 16); 26. Helmand (292; Bust 26); 27. Kandahar (682; Kandahar 117); 28. Zabul (329; Kalat 46); 29. Katawaz-Orgoon (512; Katawaz 34).

Rounded off, this amounts to 12.770 million sedentary inhabitants and, including the 2.458 million nomads, to a total population of 15.228 million.

For the presentation of data on the distribution of epidemic typhus and smallpox in Afghanistan (Table VI and XI; Maps Nr. 7, 8 and 10), however, the older provincial division with respective numbers of inhabitants, which was in effect at the beginning of the periods reported, had to be used. Early in the 'fifties, the country was divided into the 12 provinces listed below in alphabetic order: 1. Badakhsahn (0.4 million inhabitants; 10 inhabitants per square km); 2. Farah (0.3; 4/km²); 3. Ghazni (0.8; 27/km²); 4. Herat (1.1; 9/km²) 5. Jenoubi (0.9; 45/km²) 6. Kabul (1.3; 33/km²); 7. Kandahar (1.1; 7/km²); 8. Kataghan (0.9; 30/km²); 9. Maimana (0.4; 16/km²); 10. Mashreqi (1.1; 44/km²); 11. Mazar-i-Sharif (1.0; 18/km²); 12. Parwan (0.7; 28/km²).

According to this figures, Afghanistan had about 10 million sedentary inhabitants at that time; including the 2 million nomads the total population probably amounted to about 12 million [60]. Since the annual increase in population was not recorded in the fifties, the figures for the frequency of the diseases have been calculated during the whole period reported for a total population of 12 million, or for the numbers of inhabitants in the single provinces as stated above, respectively.

The attempt of compiling a map of the distribution of population *(Map No 3)* is based on the data given above, on the size of the different provinces [114 a], on the number of inhabitants of several towns [60], on statistical data kindly made available by H. HAHN [50 a] and on the distribution of settlements discernible in the base map (Map 1). Such a presentation cannot, of course, claim to be valid in all detail, but it does permit the difference in the settlement density of individual regions to be recognized immediately.

The major part of the population lives in the valleys

south only attain 2 persons per square kilometre in Chakansour and 5 persons in Helmand where the inhabitants are settled in the few cultivable river valleys; at higher altitudes (i. e. over 2,500 m.) too, the land is but sparsely populated (Ghor—10 persons per km²). As is natural enough in an agrarian country the population density thus depends on the possibilities for cultivation as well as on the geographical and bioclimatic peculiarities of the natural regions described earlier. Agglomeration of population in the few large towns of the country and the industrial centres in the process of development has not changed this picture so far. Nevertheless, it is clearly understandable that the density of population can be a determining factor in the spread of diseases.

2. The Population Groups

As a result of the innumerable migrations and campaigns which have ebbed and flowed across the Afghan country in the course of history, the population does not form an ethnic unit but rather a conglomerate composed of numerous racial elements living side-by-side in a social order which evolved gradually.

a) "True" or proper *Afghans* or *Pathans* (Plate 8 a) amount to almost half of the total population (about 7 million) [75, 101, 106, 155]. They are not held to be the original inhabitants of the country but an immigrant Iranian-Aryan group. Their real centre of settlement lies around Kandahar and in the Afghan-Pakistani border mountains, but in modern times they have spread more and more into the present West Pakistan and northern Afghanistan. Since 1747 they have provided the royal dynasty as well as the leadership of the army and government and those who live in the countryside are land owners whose wealth is made up of land and livestock.

Both tribal groups of the *Durrani* in the south and south west of Kandahar and the *Ghilzai* who live further to the east are broken up into numerous clans. There have been scarcely any anthropological investigations and for the most part members of the Afghan tribes are described as being tall, slim, vigorous and in general mesocephalic [19]. But it is sure that very varied racial elements are represented among their number. As far as their character is concerned they are held to be proud, freedom loving and bellicose with a pronounced sense of honour combined at the same time with extreme hospitableness. Within their tribes they live in accordance with old traditions; in modern times the blood feuds which have been exercised since antiquity are increasingly substituted by payment of blood money and the exercise of the law by the state. The ruling upper class in the towns has received a modern education and is susceptible to all forms of progress [19, 75, 106, 120, 155].

of about 2,000 m. With the onset of the hot season they move on to the high pastures of the central mountains in order to return to the low altitudes of the south in autumn. The wealth of the nomads is bound up with their herds, the camels, goats and sheep providing them with milk, wool, meat, fat and dung for fuel whilst everyday articles are bought from the population in villages. Wealthy nomads are increasingly acquiring their own fields in the highland which are cultivated for them by sedentary people as *lalmi* fields (vide page 82) [29, 87].

Some of the Afghan nomads are *trading nomads* (Plate 7 c and d) who have for a long time constituted an essential factor in the economy of the country. In summer they migrate to the central mountains, taking with them all manner of commodities to areas settled only by villages. There, especially in the environs of the Chahar-Aimak, they stage the great nomad bazaars [98], returning south to the warm valley of the Indus in the autumn, laden with carpets, home-made cloths, dried fruit and other products of the country.

At the same time there are *semi-nomads* who spend the winter as herders in the eastern parts of the Hindu Kush below the tree-line and the summer on the high pastures. When they visit villages they exchange some of their animal products for everyday articles they need. Pathan *seasonal workers* who move to the estates during the harvest and find work with the rice crop near Jalalabad in autumn are not "genuine" nomads [29].

Nomadism is an ancient *way of life* in the entire *Arabo-Iranian* area and even the black tents are of Arab origin. Migrations always follow the same routes which are laid down for every tribe by an unwritten law. The nomad bazaars are, however, not more than 30 to 40 years old [98], so that the trade of the nomads does not represent an original form of nomadism.

Modern times have brought much change. Trade is in the main carried on by motor vehicles on the main roads; political tensions complicate the crossing of frontiers and the journeys of trade caravans to areas south of the border. Attempts to integrate the nomads with modern economic life, whilst at the same time preserving their ecological peculiarities, are being seriously considered by the Afghan government. The realisation of such plans might take a great deal of time so that, as far as the immediate future is concerned, one cannot visualise the Afghan landscape without the nomad caravans.

b) The second largest population group are the *Tajiks* (Plate 8 c) with about 3 million people [101, 106]. They belong to the oldest population elements of the country which have been subject to Afghan infiltration in the south and, at a later date, to the Turkmen influx in the north. But even the *Tajiks* themselves form a group composed of several different elements.

As a rule they are smaller than the Afghans, al-

ment of extensive irrigation installations. In north eastern Afghanistan they are still largely yeomen, but in the south and south west they have mostly become subservient to the Afghan upper class [106]. In the towns they take over the role of traders and businessmen or work as clerks or in the middle ranks of the civil service. They are held to be an open-minded, progressive people, participating in their own manner in the building of a modern Afghanistan. They are said to be peace-loving and tolerant; they speak Persian and are Sunnite moslems [50, 75, 106, 112, 120].

c) The *Hazaras* (Plate 8 b) who number about 1 to 1.5 million people represent the mongoloid element of the population. They are distinguished by shorter growth, relatively broad heads with high cheek bones and slanted eyes; they probably entered the country in the wake of the mongol conquerors in the 13th to 15th centuries [30, 75, 139]. According to SCHURMANN, they, too, are a mixed population [120].

They live predominantly in the eastern central mountains, that is in the poorest areas of the country, where they carry on some agriculture and stock raising. In towns they form the servant class as porters, road sweepers and domestic servants. As seasonal labourers working on country estates during harvest-time they live in the manner of semi-nomads [29]. The Hazaras are Shiites and only a small group of western Hazaras is Sunnite. Their language is a modified form of Persian which contains numerous Turkish language elements. For details on individual sub-groups and tribes the reader is referred to SCHURMANN [120].

The real *Mongols (moghols)* are a special sort of people, settled in small groups at high altitudes in the Ghorat, in the Herat area and in the Afghan part of Turkestan; their way of life and social structure have been described in detail by SCHURMANN [120].

d) The *Turk peoples* are represented by 400,000 Turkmen and about 1.2 million Uzbeks (Plate 8 d) and ever since the Middle Ages they have penetrated as far as the Hindu Kush from the western Turkestan areas They live chiefly in the north of the country between Kunduz and Maimana, but as traders and settlers in modern times they have migrated as far as Herat and Seistan. They are the producers of Afghan carpets, breed cattle and when living in towns work as traders and craftsmen. Both groups are Sunnite moslems [64, 75, 106, 112].

e) Apart from these there are a number of *small population groups*. In the Wakhan Mountains there live about 15 to 30,000 Kirghiz; in Kabul the *Qizil-Bash*, numbering between 60 and 200,000, a people who belong to the Turk Mongols, are shiite by faith and speak Persian [155]; in the north of Afghanistan there are the *Karakalpaks* about 2,000 in number.

The *Nuristani* who total 60 to 90,000 people, live in the eastern mountains of Afghanistan, the modern Nuristan. They are the former "Kafirs", the unbelievers

The Sunnite *Chahar-Aimak* ("four tribes": Firuzkuhi, Taimani, Jamshidi, Taimuri plus a fifth, the Zuri) are classed among the mongol groups by WILBER [155] but among the Iranic by KLIMBURG [75]. They number about 400,000 to 450,000 people [75, 120, 155].

The Baluchi probably migrated from Central Asia in the first century A. D. Today there are about 20,000 to 70,000 of them, in part living as nomads but mostly sedentary in the southern part of the country. Their language is related to the Dravidian dialects.

In addition there are still some small groups of *Hindus* and *Sikhs* who act as traders, money lenders and bank employees; *Arabs* who moved in in the 8th century appear to have been absorbed by the resident population.

Thus Afghanistan is inhabited by a large number of different population groups, all of which have found their own territory in the course of history; in the course of time there developed an ethno-social stratification which is recognized by all groups and this has followed in its own traditions, continuing until the present day.

The inclusion of an ethnographical map is foregone here since even with the moderately accurate knowledge of the country and thorough study of the sources it is not possible at the moment to locate the habitats of individual population groups more exactly than has been done in existing maps [9, 75, 155].

3. Biological and Epidemiological Aspects

It is scarcely possible to give an account of the *age composition* of the population because registers of birth and death are not kept, the ordinary man is uncertain of his own age and the population fluctuates strongly. Only in the case of the Kabul area has the World Health Organization (WHO) attempted to construct an age pyramid (Fig. 5; reverse of *Map No 3);* it demonstrates clearly the high infant mortality which must above all be attributed to intestinal infections, whooping cough and measles-pneumonia and, in former years at least, smallpox [266, 267, 386, 399, 457]. After the tenth year of age the mortality declines rapidly and those who have succeeded in surviving the numerous infections of infancy stand a relatively good chance of reaching old age. For details on the economic importance of the population pyramid the reader is referred to HAHN [50].

There have been several investigations into the distribution of *blood groups* within the different *population groups* of Afghanistan and its neighbouring countries [6, 11, 12, 16, 81, 82, 88]. The results of the more important work, including tests [7] carried out at the Kabul blood bank, and related to the 0AB system, show the high proportion of the B constituent in all groups—a situation characteristic of Asian peoples—, and most clearly marked among the Pathans. Group A dominates in part among the Tajiks and group 0 among

Special *disease susceptibilities* among individual population groups have not been established with certainty. It is true that leprosy occurs predominantly among the Hazaras, but this is no longer considered as an indication of a racially-conditioned disease susceptibility, but far more as the result of a general weakening of resistance by need, poverty, lack of hygiene as well as impoverishment of the organism by vitamin deficiency, and possibly shortage of cholesterine as a result of continuous malnutrition (cf. page 115).

Relationships between *blood group membership* and *diseases* have likewise been suggested more than once but cannot be proved convincingly in Afghanistan. Neither the assumption that the inhabitants of plague areas manifest only a low 0-frequency because the carriers of the group have a selectional disadvantage towards plague, nor the view that the in part low A-frequencies can be seen in connection with the epidemic occurrence of smallpox, endemic there since time immemorial [102, 144, 145], can be deduced from the data of Table IV. In any case much more comprehensive investigations than are as yet available would be necessary to prove the selective disease susceptibility of members of particular blood groups.

That *nomads* can potentially act as malaria carriers is held to be certain [270 a, 389, 435] (cf. page 101); at times cholera and relapsing fever have been spread by nomads in just the same way and in earlier times the great waves of plague from Asia to the West have frequently followed the routes of trade caravans.

V. People and their Way of Life

However varied may be the racial elements within the population of Afghanistan, there have developed relatively similar or even identical ways of life. In a country that still lives mainly within old, natural bonds, soil and climate largely determine building type and settlement forms as well as agriculture, stock raising and nutrition and lastly even the manner of communal life of people within their communities. Old traditions and customs have been retained until present times and especially so among the rural population; only our present times have created modern genres de vie, alongside which the older forms have managed to retain their place. It is therefore the objective of our further description to discuss the "organically-aged" forms of civilization which permit a particularly clear recognition of their originally close relationship to epidemiology, and also to clear the view towards the new developments of modern times.

1. House Construction and the Layout of Settlements

Apart from the tents and yurts of the nomads and

chopped straw and well compacted. Windows are for the most part absent and as a rule there is a single low entrance and an opening in the roof for the escape of smoke. Cooking is often done over an open fire in the room, cakes of dried dung serving as fuel. This form of building (Plate 9 a) is found at almost all extremely high mountain altitudes and although it offers protection against cold, rain and snow it is equally unable to permit sanitary installations. Purely *timber buildings* exist only in the wooded mountains of the east and south east of the country [94, 95].

In the *alluvial cultivation areas* the house is supported either by a framework of poplar poles, filled by air-dried loam bricks and dressed with *gill*, or by massive and at times robust walls made of green bricks which afford good protection against heat, cold and earthquakes. As in many arid regions, the roof is constructed in the manner described above and forms a much used part of the dwelling during the warm season. The houses are almost without windows facing on to the alleys. In earlier times there were no glass windows and those window openings which might have been looked through from outside were closed by beautifully carved or mosaic-like sliding shutters of wood which are still to be seen in old houses; in densely settled parts of villages and towns, additional vertical protective walls were erected with the intention of barring the view into neighbouring houses (Plate 9 d) [32, 40, 50, 60, 94, 95].

The *durability of these houses* is short unless continued care is taken over the maintenance of walls and roofs; usually one part after another is substituted by new additions or alterations after a short time, with the result that in the course of time an intricate tangle of buildings, not lacking in a certain romantic and picturesque charm, is created [50, 95].

In the southern areas of the *garmsir* as well as in the north of the country where few poplars grow or termites endanger wooden structures, the place of flat roofs is taken over by *dome-shaped* ones which probably represent one of the oldest forms of construction in the Iranian-Turanian area (Plate 9 c).

Rural settlements are situated in the river valleys and are often supplied by open irrigation ditches, the water of which is frequently of doubtful hygiene. The Afghan landlord lives amidst his fields in a spacious and strongly-walled fortification—the *qaleh* (Plate 10 d). In old times the *village* was also surrounded by walls, but has long-since outgrown its frame. New buildings are made in the old style and after a short time they are no longer distinguishable from the old. Almost every village has a simple mosque as well as its *siarat*, the grave of a saint, which is surrounded by trees and often provides a quiet place of tranquillity and contemplation.

Towns, which have grown up at the intersection of traffic routes, on large rivers or in the fruit-growing

streets according to craft and trade—businessmen, traders and craftsmen offer their goods and skills, where news is exchanged and the menfolk meet in tea rooms; in total it forms a microcosm, embodying in its atmosphere the traditions of centuries. The old bazaars of Kabul, Ghazni, Tashkurghan, Mazar-i-Sharif and Herat, part covered-over to protect from solar radiation, were until recently the most charming of any known to us. Nowadays, however, many of the old bazaars have been reconstructed in the course of modern development.

There are practically no *sanitary installations* in the old houses. During the dry season a great deal of dust builds up and in the rainy season entrances, stairways and even the floors of living rooms—which are made of compacted loam—are muddy unless they are covered by mats or carpets. In spring the rain drips through leaky roofs into the rooms of the upper storey. Under simple rural conditions there are no baths, whereas in the country only the houses of the well-to-do can boast a sort of showerbath in which one can rinse onself by pouring water over the body from a bowl or jug. The use of static water, including that in a bath, is not permitted for the moslem who conducts himself in accordance with old customs and for this reason even the public baths in the old part of Kabul are arranged in keeping with this rule.

Due to the lack of wood and coal, *heating*, although necessary in the cold season, is inadequate. Stoves are unknown in old houses; a simple metal basin (the *mangal)* filled with glowing charcoal is placed beneath the *sandali*, a table-like rack that is covered by a blanket which hangs down low on all sides, so that a sort of micro-climate is created in which the entire family, seated on the floor and with the blanket pulled up to the shoulders, huddles together. This place also serves as the sleeping area at night—a fact which increases the danger of passing on lice and with it the spread of typhus.

Protection from mosquitoes, so important in the summer months, was quite impossible until the introduction of insecticides.

Kitchens in old houses are dark and badly aired and cooking with charcoal is carried out over primitive stoves. It is a matter of some admiration that Afghan housewives and their cooks succeed in producing such rich and good meals under such simple conditions.

Water supplies in the older parts of towns are in most cases open to objection. Kabul, however, was the first town in central Asia to have a water supply brought from the nearby Paghman Mountains as early at the 1920's and this was at least able to supply the suburbs; in the old core of the town there are standpipes from which water is taken to the houses in water bags made from animals skins. In addition there are wells, the water of which is not reliable.

Latrines are lacking altogether in some villages, but shaft latrines, which are widely used in arid zones, serve

large towns extensive open-style suburbs have been created [50, 107, 108]; detached houses with irrigated gardens stand behind high, peep-proof walls. For a number of years burnt bricks and a flat hip-roof of corrugated iron have even been used. In the loft tanks have been installed and these are filled with water from the Paghman once a day, and drainage pits which clear away dirty water and faeces have proved very successful. Wood-fired stoves, or in rarer cases stoves using coal mined in the country, as well as mosquito protection and modern bath installation, are part of the equipment of a modern detached house. Kitchens which used to be located near the servants' quarters, tend to become more and more integrated with the residential part of the house; even electric cookers and hot-plates are being accepted.

During the 'sixties *new plans* have been pushed ahead *in the capital* at a speed which at times is truly astonishing. Roads are being covered with asphalt, large and well-designed government, hotel and business buildings have been erected in the city (Plate 10 a) and gradually, even in the suburbs, the walls which enclose private properties seem to disappear in favour of visible gardens. Deep wells provide drinking water of irreproachable quality in some of the hotels in Kabul and Kunduz and as in Kabul, so in Khost, new water springs have already been opened up by the "Deutsche Wasserwirtschaftsgruppe Afghanistan". Road traffic has been transformed; camel caravans have disappeared from the scene and cars and 'buses dominate the capital's traffic which is regulated by traffic lights. The modern buildings of the ministries, the university and hotels are signs of a well planned reconstruction programme which points to the future and gives Kabul a new but nevertheless individual character.

In the case of new large-scale developments in the Helmand district, particularly in Lashkargah with its widely-spaced and dispersed manner of building (Plate 10 b) architectonic as well as hygiene viewpoints have been borne in mind and combined in a fortunate way.

At the same time Afghanistan strongly adheres to beliefs and traditions from earlier times. There are only a few significant religious buildings in the country; although the *mosques* of Herat (Plate 10 c) and Mazar-i-Sharif belong to the more impressive tiled buildings of the Islamic world. They are still visited by believers and the newly erected mosques in Kabul and Lashkargah show how very much alive are religious traditions in Afghanistan even at the present time.

2. Farming

a) *Agriculture*. Although only 10 per cent of its entire surface is used for agricultural purposes [75], Afghanistan must be described as an agrarian country; 85 per cent of the population earn their living by agriculture or stock raising [505]. The pattern of agriculture,

In the fruit oases of the river valleys, especially in the east, south and west of the country as well at lower elevations in the north, tillage is still based on *irrigation* as it has been since time immemorial [32, 40, 48 a, 50, 59, 95, 119]. The irrigation ditch *(jui)* branches off from the upper course of the river and runs for many miles, quite uncovered, across the slopes with only a slight rate of fall (Plate 11 b). By breaking the channel the water is guided to the fields, which are arranged in terraces and surrounded by low walls (Plate 11 c), and runs from one field to the next lower one with the effect that a relatively small amount of water serves the largest possible area. The *karez (qanat* in Iran) which runs below the surface, is known in the west and south of Afghanistan as well as in Kohdaman. The sharing of water is carried out in accordance with old, customary water rights [28].

From a *hygienic* and *epidemiological* angle these open irrigation channels are by no means unobjectionable. As the water is contaminated in a variety of ways—even by animal and human excreta—but on the other hand also used for drinking as well as the washing of lettuces and other raw vegetables, the spread of bacterial infections, as in the case of the cholera epidemic in 1960, and of amoebic infections, remains a constant likelihood. The enclosed *karez*, however, carries clean water as a rule and this can quite well be used for drinking purposes. The *juis* at least are unsuitable as breeding places for anopheles since they do not contain water at all times and are thus unimportant in the spread of malaria.

At heights above 2,200 m. and also at lower altitudes in the north, there is a good deal of *rainfall agriculture*, a practice which requires large areas of land if it is to prove worthwhile. Being situated high up in the mountains, the *lalmi* fields cannot practicably be manured and need a fallow period of 8 to 10 years for every two years of cultivation. The upper limit of tillage is at about 3,400 m. and even higher sites may be used as pastures by nomads during the summer months [48 a, 48 b, 65, 95, 148].

Crops grown are wheat (1.95 million t annually), barley (378,000 t), millets, rice (319,000 t) and legumes and, increasingly in modern times, rye as well as maize (713,000 t each); oats, however, are not important [114 a]. Where cultivation is based on irrigation—the growing of winter wheat is possible up to a height of 2,500 m. [60]—water is applied on one occasion in autumn; in spring, 3 to 4 applications are made until the grain is harvested as early as May. In areas below 1,500 m. in the east of the country two crops may be obtained if, after reaping wheat for example, maize or legumes are grown. Above 2,500 m., however, only spring sowing is possible, so that only a single crop can be obtained at higher altitudes. Legumes are used as fodder for cattle, but also for human consumption. *Vicia fava* is grown in many places; favism occurs frequently in and in addition it does not transfer any possible salt efflorescence at the soil surface down to the seed root level [148]. A sickle, the cheapest tool, is used for cutting and it is also the instrument which causes the lowest losses through dropping over-ripe grains (Plate 11 a). Threshing is carried out by oxen (Plate 12 a) in common with places throughout the Orient and the threshed grain is cleaned by throwing it into the wind (Plate 12 d), a process that is good for removing husks but less so for weed seeds. The question, much debated in earlier times, of a link between leprosy and a lingering intoxication from saponiniferous grain impurities (corn-cockle) can only be mentioned here.

The *yields* from tillage in high areas are meagre and in many places they do not exceed a two or three-fold increase over the amount sown. The extensive fields on the fringe of the Turkestan loess steppe in the north of the country, however, return good yields under dry agriculture [106] and in the case of wheat yields of more than 2,000 kilos per hectare have been recorded on good soils [115].

Numerous varieties of *rice* are grown, but on the whole only thick-grained *(luck)* and thin-grained *(maïn)* rice are distinguished. Areas of cultivation are the Nangarhar Province, Khanabad region, the Heri Rud valley and to a small degree the Kabul basin as well. The fields are kept under water from spring until late summer, that is until harvest time and thus provide good breeding places for malaria vectors [273, 441]; the ban on growing rice within the immediate vicinity of the capital—that is within flying range of the malaria vectors—is thus justified. As the harvested rice is peeled but not polished in the rural rice mills, there is no danger of B-avitaminosis, even where rice is the pre-eminent foodstuff.

The *growing of vegetables* is based on old traditions; carrots, turnips, beetroot, radishes, onions, leeks, lettuces and aubergines have been known for a long time and in modern times there has also been increasingly the cultivation of cabbage, tomatoes and potatoes. For those who recall the Afghanistan of an earlier time, the sight of potato fields in the Logar valley must present an astonishing and unaccustomed picture. In the north sugar beet are grown increasingly but sugar cane is confined to the Nangarhar Province.

The cultivation of *cotton* (17,318 t) in the north of the country has developed to an economically important factor in the course of time [75, 114 a, 115].

The kinds of cultivated *fruit* are numerous. Melons require irrigation to be repeated on at least six occasions, but since the fields dry out again in the intervening periods they are not breeding places for anopheles. Many kinds of stoned fruit and especially apricots, as well as grapes, are grown in Kohdaman, Kohistan and near Kandahar and constitute important export commodities. In all cultivated areas of the country mulberry trees are to be found, but citrus fruit and dates are confined to

oases of Tashkurghan, Mazar-i-Sharif and Akcha, irrigation systems have been extended or newly developed with the aid of FAO and within the framework of the first Five Year Plan. The existing cultivated areas in the Kunduz valley as well could be extended considerably, and the Koksha project first entered into in 1950, as well as the recently discussed Amu Darya project, show how much the Afghan government is striving to enlarge the cultivated area.

The most important of these enterprises is the opening up of the Helmand District with the waters of the Bogra Canal (Plate 12 c) which starts about Girishk and which is being financed by loans from the World Bank. It will make possible the creation of the new fruit oases of Nad-i-Ali, Marjan and Darweshan as well as enlarging the agricultural area near Kandahar by the waters of the Arghendab Canal (Plate 12 b). So far 70,000 ha. of existing fields in this district have been protected from flooding; another 70,000 ha. have increased their yields by 25 per cent. thanks to improved irrigation and 75,000 ha., 8,000 ha. of which was virgin land, have been opened up in the Helmand-Arghendab valley where wheat, cotton and lucerne are already growing. The intention is to bring altogether some 300,000 ha. under the plough eventually and to provide at the same time a living for thousands of new settlers [86, 105, 115, 132, 148, 149a, 155]. The recently founded town of Lashkargah is the centre of the newly created agricultural area in the Helmand district and at the same time a symbol of the regeneration of these once so fertile areas.

The *Nangarhar project* which is probably now near completion, is intended to irrigate about 65,000 ha. of fields near Jalalabad [61, 149 a].

For details on the question of the possibility of spreading *parasitic infections* like ankylostomiasis and bilharziosis in newly opened areas the reader is referred to page 126 and 127.

b) *Stock raising.* Next to agriculture stock raising is the second most important sector of the Afghan economy. About three million people, two million of whom are nomads, live entirely or predominantly from their stock which are mainly kept where other forms of land use are not economic or are totally impossible. A peasant may keep one or two cows as draught animals and milk producers for his own needs. The great flocks of sheep and goats which constitute over 80 per cent of the entire livestock population, graze on the meagre steppes or on the highland pastures; if they belong to nomads they also feed on the winter pastures of the *garmsir* in the south. Yaks are kept in the high Wakhan mountains. For the year 1341 (1962/63), 6.6 million Karakul sheep, 16.3 million other mostly fat-tailed sheep, 3.7 million cattle, 2.3 million goats, 0.3 million camels, 1.2 million donkeys and 0.3 million horses were reported, so that the entire population of large cattle amounted to about 30.7 million animals [115]. It is not surprising affected by brucellosis [546]—and this is especially so in the case of cattle. A veterinary service is being built up; the vaccination centre in Kabul has already produced considerable quantities of rabies vaccine for veterinary purposes in recent years. In the year 1343 (1964/65) a total of 2,364,00 animals is said to have been immunised against various diseases [134]. For details on human brucellosis and echinococcosis see page 122 and page 125.

Poultry farming concerns itself chiefly with chickens and pigeons; great numbers of the latter are often kept in large dove cots (Plate 9 b), partly to produce fertilizer and partly food—a practice analogous to that in Iran. Nothing has come to our attention concerning bird diseases or the question of ornithoses in man.

3. Nutrition

The greatest part of the population is poor and forced into the strictest frugality. *Bread* and *tea* are the main foodstuffs for 80 per cent of the population [40, 86, 155]. But because the whole grain is ground, the flour contains the entire protein, vitamins and minerals, and the national flat bread constitutes a relatively valuable food. It has only been in modern times that the European type of white bread has been baked in towns, but it has not been accepted with enthusiasm by the native population. Roasted maize cobs can be seen in the bazaars today, but on the whole maize serves as cattle fodder.

Protein is supplied in the main by *milk* and *milk products.* Sour milk in the form of *maast* (yoghurt) or *dogh* (diluted sour milk with cucumber juice and spices added) is nutritious, refreshing and hygienically unobjectionable so long as it is prepared from boiled milk. In any case it is not usual in Afghanistan to consume unboiled milk. *Krout* is a slightly salted, sun-dried cottage cheese which looks like a piece of pumice stone and is offered in the bazaars; it is reconstituted with water and is used to complete vegetable and rice dishes. *Eggs,* although they are relatively cheap to date, are, nevertheless, not within reach of the great numbers of poor people. *Legumes* such as muschong peas, provide further opportunities for protein consumption.

As for *fat* fresh butter is but rarely used, although melted butter mixed with fat of beef and mutton *(roghan)* is popular. The fat of sheep tails *(dombah)* is regarded as a special delicacy, although it is now chiefly used by the rural population.

Meat is only rarely enjoyed by the poor population—that is, once a week or even only once a month [155]. Mutton is the meat preferred in the Islamic countries, especially in the arid zones; beef is not considered as being of top quality. All meat dishes are boiled thoroughly; raw meat is never taken and even the small pieces of meat *(kabab)* grilled on a spit over an open fire and the meatballs fried in butter *(kufta)* are

avoided as being unclean. Chickens, pigeons, wild ducks and rock partridge as well as game are only seen on the tables of the rich.

Fruit used to be really cheap but it has increased in price in recent years. The selection available in the bazaars is plentiful almost throughout the year. Dried mulberries, grapes and walnuts are offered everywhere, even during the winter months. *Vegetables* are prepared with much fat in a very tasty way, but do not play the role in Afghan cuisine that they occupy in the European one.

The Afghan national dish, *rice* prepared in many different ways with fat, mutton or chicken and various spices as *pillao*, is a feast for the poor man but makes frequent appearances on the table of the wealthy and is generally well liked by foreigners as well.

Sweet dishes are made from rice- or maize-flour; candied fruit and simple, mainly rather dry rice cakes may be found in the bazaar.

Beverages are chiefly black and green tea, both of which are drunk strongly sweetened. In addition the sour milk preparations mentioned above are also enjoyed; fruit juices are taken more rarely. Recently lemonades, which are rather too sweet for our taste, have also been introduced.

Spices are numerous: *turshi* are sour vegetable pickles, rather like our own mixed pickles. Grape leaves, curry, ginger, leek and onions are much used and the bazaars offer great numbers of different spices—albeit not always agreable to the European taste.

As for *other luxuries*, tobacco smoked from a hookah continues to be enjoyed by the rural as well as the humble urban population as was always the case, but the cigarette is increasing in popularity. Hashish is still frequently smoked but opium, however, has never played so important a role as in neighbouring Iran. Alcohol is avoided by the great majority of population in town and country alike and it is only modern townspeople who have been introduced to foreign habits who often ignore the religious prohibition.

It would be scarcely correct to assume that the *rural population* enjoys a higher living standard than the poorer classes of the urban population because manufactured and imported goods which the farmer is also obliged to buy (cotton, sugar, tea) are so expensive that he must give much of his produce in order to be able to buy them [155]. It is, however, to be hoped that the opening up of large areas for intensive agriculture will gradually improve the standard of living of the rural population.

The most favourable nutritional state, in any case as regards protein supplies, is to be found among the *nomads* whose own stock supply them with sufficient meat and milk. As milk is abundant only for a few months of the year, the surplus is made into melted butter and *krout*, so that a fat and protein supply is ensured

adapting our diet as far as possible to that of the country.

The *fasting time (ramadhan)* is still observed during the tenth month of every lunar year. It is kept strictly by the majority of the population with the sole exception of sick people, pregnant women and travellers. From daybreak to sunset no eating, drinking or smoking is permitted. In the hot season strict fasting is difficult and towards the end of *ramadhan* a certain paralyzing languor is noticeable everywhere. Despite this experimental tests have shown neither a change in the circulation nor of the mineral metabolism, the blood picture or secretion of gastric juices; only the blood sugar values drop temporarily but rise quickly to their normal level once the fast is over [73, 74, 89]. The educational value of this religious exercise which is carried out by all sections of the people, cannot be underrated in any way even in modern times, even though some of the young enlightened generation are beginning to relax or ignore the old rules of ramadhan.

Geophagy was observed only on extremely rare occasions. It was not clear whether it was related to any deficiency symptoms or just to the bad habits of children. It has not, for example, been proved whether geophagy can effect an increase of re-absorbable calcium and silicates during pregnancy [90].

4. Clothing

The original dress of the Afghans is based on the products of the country and corresponds to the climatic peculiarities. Wide linen trousers with shirts falling down over them which among the Afghan tribes are often beautifully decorated with embroidery or small mirrors sewn on the cloth, the similarly embroidered waistcoats and the loosely-tied turban, the coarse shoes of the men as well as the baggy trousers, the long trailing veils and the top dresses of the women—all these have persisted among the rural population and the nomads until recent times, even though the latter go without a veil but have instead a shawl. In winter a long sheepskin, tanned and ochre yellow and embroidered in red, is worn as protection aginst the cold.

Since the time of Amanullah the international dress of a two or three-piece suit has been accepted by the middle and upper classes and the karakul cap *(kullah)* is widely worn as a head-dress. Since the rule on the wearing of veils has been lifted, Afghan women have developed a fashion sense as well and have quickly adpated to international dress.

5. Beliefs, Traditions and Folk Medicine

The state religion in Afghanistan is Sunni Islam; about 80 per cent of the population confesses the orthodox school of Abu Hanifa, while 18 per cent, mainly the Hazaras and Qizil-Bash, are shiite. The remaining 2 per cent are Ismaelis or members of other

unless they can be explained by their close relationship with nature. Secularization moves slowly and only then among the young townspeople who have been educated in the modern manner.

The prescribed ablutions, the avoidance of "unclean" dishes, of forbidden luxuries and static water as well as traditional customs at religious and family festivals are, moreover, carefully observed. It is therefore assumed that many religious rules embody an hygienic intent and for that reason it is mentioned but briefly.

Family ties are strong. The choice of a bride is for the most part made by the parents. Only in recent years has polygamy gradually given way to monogamy and this for economic reasons among the poorer section of the population and for ethical reasons among the modern and enlightened generation. Similarly *tribal* ties are of great, even social importance, especially among the Afghan Pathans.

Readiness to help each other is great and nobody will suffer serious hardship as long as he enjoys the protection of a family. The great hospitality which we met among the Afghan population on our travels in the course of many years, whether it was from friends or in the homes of total strangers, never failed to impress us deeply. In the capital, however, traditional hospitality is bound gradually to disappear as modern development proceeds. Nevertheless, I am convinced that it will persist in rural areas for a long time to come as one of the most striking characteristics of the Afghan people. For further details on religious and social customs the reader is referred to KLIMBURG [75] and WILBER [155].

Circumcision of boys is carried out early, often in the first or second year of life, and is associated with considerable family celebrations.

Closely related to the world of belief is the recognition of the existence of *supernatural beings*—of spirits *(jinn)*, of fairies *(pari)*, of angels *(malak)* and giants *(div)*, as well as the souls of the deceased—who may appear to human beings and whose existence is partly acknowledged by the Koran. These beliefs are held especially by the older generation and among the rural population and nomads. Most widely spread is the popular belief in *jinn*, evil spirits described at times as dwarfs with flaming hair and glowing eyes who are said to play pranks on humans [23, 31, 42, 155].

Many features of the old *folk medicine* have survived into modern times [31]. Theurgical elements in the shape of invoking one of the names of Allah constituted the treatment by the mullah. In Afghanistan as well as in Iran, magic squares, constructed in accordance with the *abjad* number series, are drawn on the sick parts of the body whilst prayers are said or written on paper and enclosed in small silver boxes to be worn on the body as talismans or amulettes with the intention of averting or even curing diseases and deterring evil spirits. The depth to which magical prescriptions and traditions are rooted among the people may be appreciated from the medicine is accepted, whereas the "warm" drug is eagerly taken in cases of "cold" fever (malaria with shivering cold).

Little is known about the medicaments handed out by bazaar physicians *(hakim)*, but it is worth noting that the drugs used in folk medicine are called "Greek" *(dawa-i-junani*, i. e. ionic or Greek) [31]. For details on medicinal plants which occur in the country see the list compiled by VOLK [149] and compare page 76.

The term *"wind diseases" (baad)* may well be of Greek or Indian origin. Rheumatic troubles, dizziness, headaches *inter alia* may be caused by wind in the body vessels—a view that was probably held in the entire Middle East from Persia to India and even beyond to Tibet.

Blood-letting cures by bleeding or cupping are often applied, as is bloodless cupping. This latter causes a strong local hyperaemia; a small, hollowed pumpkin serves as a suction vessel, hence the term *kadugak*. *Cauterizing cones*, which according to Hippocratic notions were the ultimate therapy, are applied in cases of chronic disease.

Thus here at the "crossroads of Asia", the meeting point of several cultures, a folk medicine containing Greek, Indian and possibly Arabic elements, has survived, even though it is progressively disappearing in the face of modern western medicine which is highly regarded. It will probably continue somewhat longer only in rural areas.

6. Economic Aspects

The structure and development of the Afghan economy is barely related to geomedical problems and will therefore only be mentioned briefly. The reader who is interested in politico-economic questions will find the field well covered in the subject literature [2 a, 35, 36, 37, 75, 86, 97, 115, 122, 125, 132, 133, 134, 134 a *inter alia*].

Cultural geographical peculiarities and an industrial development that was only started in recent times go a long way in explaining the fact that handicrafts and cottage industry have been preserved until now. It is estimated that about 10 per cent of the tribal population are employed as craftsmen or in small cottage industries [60, 115], and numerous artisans such as the metalsmiths, carpenters, cobblers, tailors, hatters and bakers who work in the open streets of the bazaars, to a large degree determine the life and events in the old quarters of the town. The quality of craftsmanship has, however, suffered greatly in the course of the last three decades on account of the import of cheap commodities from overseas.

Despite this the *manufacture of carpets* in the north of the country, which is largely carried out by girls and women, has been preserved as a cottage industry. The eight-cornered *filpai* or elephant footstep, is characteris-

considerably accelerated in the course of two five years plans with the help of foreign experts and international institutions.

The opening up of *agricultural cultivation areas by* modern irrigation works and the restructuring of stock raising has already been dealt with to a sufficient degree on page 82.

For the extension of *industrial plants*, which has progressed markedly over the last few years, the transport problem (all goods traffic is carried on the roads) and above all the question of power supply have become the key issues [122]. Jurassic coal is extracted from drift mines at Ishpushtah and more recently from pits at Karkhar and Dar-i-Suf near Mazar-i-Sharif. In the year 1342 (1963/64) some 99,200 tons were mined, a considerable part of which was used in the two cement factories at Ghori near Pol-i-Khumri and Jabel-uz-Seraj, so that comparatively little was left over for the remaining industries and private consumption. What is more, transport by lorry across the Hindu Kush increases the cost of coal—which is in any case not very valuable—to such a degree that coalmining is scarcely the means which might halt the cutting-down of the forests in the east of the country which has continued for years [26, 75, 104, 107 *inter alia*].

Mineral oil and *natural gas* have been discovered in the Bactrian plains in the region of Mazar-i-Sharif and Shiberghan. With the use of Soviet aid and particularly in the case of the natural gas, these are to be exploited and exported in part to the U.S.S.R. [104, 115].

In the main Afghanistan is dependent on transforming the existing *water power* into *electrical energy*. Smaller power stations had already been built before the war and since then further plant like that at Girishk (3,500 Kw.), Sarobi (22—43,000 Kw.) (Plate 13 b), Arghendab (30,000 Kw.), Kajakai (130,000 Kw.) and the recently completed Mahipar works in the gorge of the Kabul river below the capital (60,000 Kw.) have been built with the help of foreign aid. If plants like that at Naghlu (50,000 Kw.), Jalalabad (11,000 Kw.) and Laghman (5,000 Kw.) which were still in the process of construction a short while ago, together with those installations which were set up at an earlier date and are run on diesel fuel, are added together it would seem that the total amount of electrical power can guarantee the supply of electricity for some years ahead. In the year 1341 (1962/63) a total output of 149.8 million Kwh. was quoted, but in view of the continuous progress of industrial development this will cease to be sufficient in the already forseeable future. The construction of more plants will become a necessity [115]. The opening up of springs for use in water supplies for industrial development is one of the important tasks of the *Deutsche Wasserwirtschaftsgruppe Afghanistan*.

The most significant branch of industry is that of *textile mills*. In the large factories of Pol-i-Khumri and Gulbahar (Plate 13 a)—the latter with 46,000 spindles and 1,400 looms—60 million running metres of cloth could be produced each year, although the actual production only amounted to 35.8 million metres in 1341 (1962/63). Woollen cloths are only produced in small quantities and of limited quality in Kandahar and Kabul [115, 133, 134, 134 a].

Without any claim that they represent a complete coverage, further *branches of industry* should be cited as follows: the cement factories in Jabel-uz-Seraj and Ghori where about 103,000 tons of cement were produced in 1342 (1963/64) [115, 133, 134]; a briquette factory; a soap and candle factory; a match factory; a stone and marble grinding works in Kabul and in the new Lashkargah; two sugar refineries, the one for cane in Jalalabad and the other for beet in Baghlan, together producing about 7,000 tons a year. In Kandahar there has been a fruit-canning factory for years which started from small beginnings. A new plant designed to produce dried fruit, canned fruit and fruit juices from about 35,000 tons of fresh fruit annually began production in 1962 and of late Kabul has got a plant for the processing of grapes into dried fruit. In the field of tanning which is economically important as far as sheep raising is concerned, there is still room for improvement [75, 115].

For information on the *ores* which occur in the country, mining of which has started in some parts as well as on rock salt deposits see page 70.

The *export balance* is headed by karakul pelts which number about 1.5 to 2 million pieces, most of which went to the U.S.A. These are followed by fresh fruit (23,000 tons), dried fruit (22,600 tons), wool (5,750 tons), cotton (9,370 tons) and carpets amounting to 164,800 square metres, as well as hides and gut. On the other hand, *imports* consist in the main of consumer goods such as foodstuffs (even wheat), cloth fabrics, clothing and shoes as well as investment goods such as fuels, motor vehicles, machines and other basic materials for industrial manufactures [figures for 1342 (1963/64); 75, 115, 133, 155].

On the whole the industrial structure of Afghanistan is still in its infancy. The organizing of another industrial centre based on natural gas and mineral oil is planned in the region of Mazar-i-Sharif. But by 1342 (1963/64) only 20,000 persons, that is about 1.4 per cent of the population, are employed in the 72 industrial forms which operate in the country. As a proportion of the current gross national product, industrial production is estimated to have a maximum 5 per cent share [115]. It is therefore clear that Afghanistan is certain to retain the character of an agrarian state for a long time to come.

services, is to be met by the setting up of special *teacher training* colleges [75, 115, 133, 421, 505].

But considering the shortage of physicians, the lack of modern sanitary installations, the high mortality, the malnutrition among a large section of the population and the high infant mortality, it was a matter of special concern to the government to promote the training of doctors, the equipping of hospitals and the organization of a public health service.

I. The Medical Faculties

1. The Medical School in Kabul

In order to counter the urgent shortage of doctors, several European and Indian physicians were called to the country in the 'twenties and 'thirties, and these took up positions in the state service as well as in private medical practice in the capital. Young Afghans—mostly those who had completed their schooling in foreign-language grammar schools—went abroad in order to study medicine.

But above all the Afghan Ministry of Education founded a *medical school (maktab-i-tibi)* as early as 1932. In a shortened three year "crash" course a number of assistant doctors were trained, and employed for the most part in simple ambulances in the country. I myself worked for several years with students of this *maktab-i-tibi* in the out-patient-clinic of the city of Kabul and was most pleased by their eagerness to work and learn. Almost without exception they completed their studies in the university and took the regular state examination. Towards the end of the 'thirties in the course of further developments the *maktab-i-tibi* was closed down.

2. The Faculty of Medicine in the University of Kabul

In 1932, at the same time as the *maktab-i-tibi* was founded, the *medical faculty*, as the first faculty of what was to become the University of Kabul, was set up together with related science subjects. The intention was to offer young Afghans the opportunity of a full period of medical study in their own country. The first generation of lecturers was provided by Turkish specialists and the first eight students left the faculty in 1938 in order to complete their training in hospitals. During the war years the courses were still continued and in the first years after it the lecturers who worked there were chiefly French, and to them must be given the credit for investing the faculty with its present character [214, 460]. The programme of studies in its basic features is adapted to the French system of education; the course is made up of eleven semesters, and after passing the main examinations the doctor's degree is awarded without a special oral examination or submission of a thesis. The French lecturers taught in their own language, inter-

pharmacology, bio-chemistry, gynaecology and epidemiology incl. infectious diseases [214]. Gradually as their contracts came to an end, the positions of the French lecturers were taken over by *Afghan staff*, that is by colleagues who had studied abroad or undergone further training in foreign hospitals. They now represent the majority of lecturers in the pre-clinical and clinical subjects in the medical faculty of Kabul University [75, 115].

After the war, buildings to house the department of *pre-clinical studies* were erected in Aliabad and equipped with the most necessary installations and apparatuses. The greatest difficulties were encountered in the course of anatomy instruction, which, due to an interdict on the dissection of corpses being in existence until 1948, had to be given with the aid of models and teaching diagrams—a procedure which could achieve no more than an incomplete understanding of morphological, topographical and functional anatomy among the young medical students [75, 155].

Clinical instruction was conducted in Aliabad University Hospital, opened in 1939 and containing 350 beds, as well as in the hospital for women which had 150 beds. Since an examination of women patients by male doctors was almost an impossibility in those days, gynaecology and obstetrics were first presented by a German and Turkish, and later a French, female doctor. In addition the state out-patient clinic with its vast number of patients, the tuberculosis sanatorium and the neuro-psychiatric ward (80 beds) were available for clinical instruction purposes.

The *student numbers* increased every year and already in the 'fifties, but particularly after the abolition of the veil in 1959, more and more women attended medical courses. In 1963, 104 of the 644 undergraduates were female, and of 655 enrolled in 1966, 111 were women [75, 386]. As specialists for women's diseases or for children, in the struggle against T. B. and in the social services—in short, wheresoever the establishing of contact with the women in patients' families is important—female doctors can perform the most beneficial work, and particularly is this the case where the prejudices handed down from olden times have to be gradually replaced by modern concepts [421]. In the period from 1932 to 1967, 758 young doctors of both sexes had completed their studies at the medical faculty of Kabul University, although many of them had ceased or had never practiced their profession [386].

Dental training still leaves a lot of room for improvement. So far no dental department has been set up within the medical faculty, although a new dental school is being built in Kabul and one of its tasks will be the training of dental personnel.

A *nursing school*, founded in 1936, is, however, attached to the medical faculty; in 1966 it was attended by 77 male and 75 female pupils [155, 386]. There are, moreover, training facilities for *male* as well as *female*

from the medical faculty founded in 1932, there are now a faculty of law (1938), one of science (1942), one of arts (1944), one for theology (1950), and others for technology (1956), agriculture (1956), economics (1957), pharmacy (1959) and pedagogics (1962). Since 1962 there has also been a faculty of domestic science which is attended by female students only [75, 134, 386].

The Afghan government has done everything possible to press forward with the development of the university. In 1964 the number of academic staff, including assistants taking part in teaching, including 64 foreigners, amounted to 503; thus with a total of 3,126 students the staff/student ratio was about 1 : 6, undoubtedly a satisfactory proportion [114 a, 134]. In order to raise the standard of teaching, the Afghan Ministry of Eduation has entered into partnership with overseas faculties—as for example, the connection with the medical faculty of Lyon and La Sorbonne, with the natural science and economics faculties of Bonn and Cologne respectively, lecturers from which are given leave of absence to teach in Kabul as guest lecturers. From time to time Afghan lecturers are given scholarships for further studies overseas. The hospitals and departments at Aliabad have been enlarged and as a start to the grand project of an all-inclusive university city at Aliabad, new lecture halls, a library and a student hall of residence with 1,200 beds—most of which are arranged in 2 or 3 bed rooms—plus its own laundry, bakery and modern refectory where European food is also served, have been built (Plate 14 b—d).

If teaching has been well to the fore at Kabul University so far, then the task of the near future will be to develop scientific research as well, and in this endeavour the participation of foreign guest lecturers ought to be particularly helpful. The beginnings of this are already discernible and the inception of such scientific periodicals as the "Geographical Review" or the zoology and parasitology-orientated "Science" as well as the "Afghan Medical Journal" to name but three, may provide the incentives for the young Afghan in the investigation of scientific problems—numerous enough in their own country—and for the publication of their results in their own specialist journals.

During my last visit to Kabul I was deeply impressed by students and teachers alike who appeared to be genuinely convinced of the necessity of their activities and to be motivated by a serious sense of responsibility for the tasks of the future. Anyone who has followed the development of Kabul University over a period of three decades from its start to its present state cannot encounter the present level of progress without approbation and will also face the future development with a feeling of confidence.

3. The University of Jalalabad

In 1963 a second university was founded in Jalalabad, graduates, although in recent times a *Faculty of Agriculture* has been added as well. So far no further faculties have been opened.

II. The Medical Profession

Even in the 'thirties, foreign doctors who were employed in the faculty of medicine and in the municipal out-patient clinics also looked after a substantial part of the medical practices in the city. There were already some Afghan doctors in addition who had studied abroad, but these were appointed in increasing numbers to leading positions in the medical administration, which has always been in Afghan hands although advised by foreign specialists. Thus the already too small numbers of practicing physicians were further diminished and in the 'forties the lack of doctors, even in the capital, was still very strongly felt. The medical service in provincial towns and in the country areas was totally inadequate at that time, however, and out-patients often travelled for several days from remote places in order to be medically examined and treated in Kabul.

In the years after the war the *number of doctors* increased every year, albeit slowly. In the year 1955 there were about 200 physicians [500, 540]; i. e. with an estimated population of 10 to 12 million inhabitants there was one doctor available for every 50,000 to 60,000 persons in Afghanistan. In 1960 Wilber [155] placed the number of physicians at about 300, and in 1343 (1964/65) there were 427 resp. 441 in the entire country [134, 134 a]. At present Afghanistan has about 546 doctors according to Survey of Progress [134 a], that is with a population of 15 million, one for every 27,500 inhabitants. By comparison with other countries in the Middle East it is considerably understaffed with doctors, even at the present time [540], the more so since specialists and hospital doctors are contained in this total, although they rarely or never take over general practitioners' duties.

Furthermore the *distribution of doctors throughout the country* is extremely unbalanced. In the Kabul Province with its 1.177 million inhabitants, a total of 452 doctors and assistant doctors are registered, i. e. one doctor for 2,600 inhabitants, and as these are almost without exception living in the city, Kabul with a population estimated at 425,000, has one doctor for every 940 inhabitants [134, 134 a]. The city and province of Kabul are thus comparatively much better supplied with doctors than the average for the country. This is to be expected because most of the country's hospitals are in Kabul and life is far more attractive in the town than in the country. Larger provincial towns such as Kandahar, Herat, Mazar-i-Sharif, Jalalabad and Pol-i-Khumri are relatively well supplied with doctors, whilst the remaining provinces, and particularly those in the remote mountain areas, do not have

Specialists are trained in the university hospitals of Kabul. Apart from this the Afghan government has always been concerned to send able doctors to recognized university clinics in Europe or the U.S.A. for at least part of their specialist training.

Foreign doctors, who still numbered thirty in 1343 (1964/65) [134], are now employed as lecturers in the Faculty at Kabul, as specialists in hospitals and institutes, as advisers commissioned by international organisations, as embassy doctors and as doctors at construction sites under the aegis of big overseas firms. According to "Survey of Progress", eleven foreign doctors were quoted as being employed in Afghanistan in the year 1345 (1966/67) [134 a]. Medical situations in the provinces, in so far as they are under the control of the Ministry of Health, have been taken over more and more by indigenous doctors. A permit to conduct a private practice among the Afghan population is no longer granted to foreign doctors and consultants on a contract basis, although they are, nonetheless, allowed to attend to foreigners domiciled in the country in their free time; they may also undertake consultative activities with registered Afghan doctors where commissioned by superior authorities.

The greater proportion of all Afghan doctors, even in the towns, is *employed on a salary basis* by the Ministry of Health. It falls within their responsibility to look after the hospital under their care and following that to attend to the out-patient visiting time connected with it, which in the towns may often be attended by more than one hundred people in a single morning. If requested, bedside visits must also be made in accordance with the contract. A private practice which may be run outside regular hours, can be remunerative in town, but in the country and particularly in poor areas, it provides virtually no increase in salary.

Yet it is in the country that difficulties in the carrying out of medical services are still unimaginably great. Need and misery among the innumerable patients in the villages, the long distances involved, tracks which are scarcely passable in the mountains, the lack of sanitary arrangements in the houses, the application of folk- or quack medicine along with correct medical treatment, the bashfulness of patients, especially among women, towards medical examination, the difficulties of conducting an examination which arise from the position of patients who lie on the carpeted ground, prejudice against prescriptions which are given, as well as the troublesome business of obtaining medicines—all these contribute in making the physician's task so difficult that this is a practically impossible undertaking and far more so in the country areas than the towns. Quite understandably some young doctors show little inclination to accept a rural post, particularly as no commensurate financial incentive can be offered.

Future development, which is already discernible, will aim at staffing the remoter areas more closely with

supplies hospitals and state dispensaries with medicines and instruments, and in addition there are 57 pharmacies in Kabul and a further 192 throughout the country [i. e. situation in 1964: 114 a, 134], and these purchase their medicines quite unrestrictedly from abroad with the result that a confusing multitude of proprietary medicaments from different countries is offered for sale in the bazaar. The general practitioner is well advised to acquire some general knowledge of the medicines offered at the start of his career. Foreign proprietary medicines are much preferred by patients and confidence in prescriptions made up by pharmacists is limited. With the foundation of the Faculty of Pharmacy in 1959, a decisive step foward was made towards the improvement of pharmaceutical training and thus for the entire dispensary organisation.

III. Hospitals

In the course of the last decades, in towns as well as in the country, numerous hospitals have been established, the newer ones of which are at times reasonably well equipped. The great majority of hospitals is under the control of the Health Ministry, while a few industrial hospitals are under the authority of the Ministry of Public Works and Mining as well as some under the aegis of textile, cotton and oil companies. They are intended for the workers and salaried staff of these institutions (see also Table V). The following summary provides an outline of hospitals at present available in Kabul and in the provinces, although it omits the military hospitals for which no statistical data have been published.

1. The Hospitals in Kabul

The *University Hospital* (for men) situated in Kabul-Aliabad, has about 500 beds, including those of the tuberculosis ward, and was built towards the end of the 'thirties and has been enlarged on several occasions since then. There are specialist wards for the most important branches of clinical medicine, but the number of beds available for certain subjects, particularly in the smaller specialist wards, is inadequate. The buildings are no longer modern although they are able to function and their equipment, including the fittings of the operation theatres and the X-ray installations, is still sufficient for present demands. The doctors are mainly Afghans, some of whom have been trained in their specialism in Kabul, some in Western Europe and America and in recent times some even in Eastern Eruopean countries. A few foreign lecturers who teach in the faculty (vide page 87) are available for consultations. Both male and female nurses are Kabul-trained. Food for the patients is prepared in the Afghan manner.

The *Hospital for Women* is an old complex of buildings in the old part of the town. It has undergone several

small children's diseases and the high child mortality, it is of especial and ever-increasing importance. The fifteen pediatricians practicing in Kabul are by no means capable of coping with all the cases which arise from the increased volume of pediatric practice resulting from medical information campaigns. Children's medicine—that is the clinical and ambulant care of sick children—accordingly needs further expansion.

The *Avicenna Hospital* with its 110 beds has been converted from the former municipal out-patient clinic in the Chendaol part of the town; attached to it is a private ward run by American doctors and nurses. The medical direction of the hospital is in the hands of an Afghan surgeon (Plate 13 c).

The newest and most modern hospital in Kabul is the *Wezir Akbar Hospital,* opened only a few years ago. It has 180 beds, modern operation theatre facilities, an X-ray station, a physiotherapy ward as well as a modern laundry and kitchen which prepares both Afghan and European diets. The site and the building style both permit any requisite extensions without difficulty. Czechoslovak specialists, whose wives are often employed in the same hospital as assistants, nursing sisters or gymnastic instructors, are in charge of the individual ward and again the chief physician is an Afghan colleague.

The *Maternity Hospital* in the Shararah part of the city was also a former municipal out-patient clinic. With its 65 beds, it is run by the charitable organisation "Mother and Child" *(rozantoon).* Several alterations and extensions have made it into a viable complex and its duties and achievements are mentioned on page 91.

Both the *tuberculosis hospitals in Aliabad,* the one for men (100 beds), the other for women and children (67 beds), are older establishments in which conservative forms of treatment prevail, and their equipment permits active treatment of tuberculosis to a limited degree only.

The *total number of hospital beds* available in Kabul has risen from 919 in 1338 (1959/60) to 1,447 in 1342 (1963/64) and might well amount to 1,400 if the ward in the Poorhouse, the sick beds of the Ministry of Public Works, the Institute of Technology, and of the prison as well as the small country hospitals at Paghman and Mirbachakot were inlcuded [133, 134, 134 a, 482]. If one took account only of the inhabitants of the city itself, there would therefore be approximately one bed for every 300 people, but if one allows for the province as a catchment area this ratio would rise to one bed for every 840 people. Since, however, patients in fact travel from all over the country to Kabul for treatment, the number of beds per person should by no means be taken as excessive but rather more likely as being insufficient.

In addition Kabul has a *central out-patient clinic* which is also under the control of the health ministry. Out-patient consultations are held there by several specialists in the forenoons and they are always in great demand. Figures on the current attendance frequency of patients which was equally well attended. In 1964 the erection of a new building for the central out-patient clinic was planned because the original structure had long since become too small and out-of-date. It is to be expected that building has started in the interim and that it may even be approaching completion.

If Europeans and other foreigners living in Kabul have so far not liked to trust themselves to Afghan hospitals they should not be criticized. It is only natural that the patient places his trust firstly in doctors of his own home country who speak his language, react as he does and enable him to establish the personal contact which is necessary for successful treatment. In the Kabul hospitals, which are obviously built primarily for Afghan rather than European patients, unaccustomed meals and nursing by staff who generally speak no other language than Persian, probably constitute the greatest strains for the foreign patient. In the new Avicenna and Wezir Akbar hospitals these difficulties are being met as far as possible but it nevertheless still proves difficult for some European patients to adapt to the atmosphere of an Afghan hospital unless they are well acquainted with the customs of the country. European and American hospitals are, moreover, held in high esteem even among the Afghan population and well-to-do Afghans prefer even nowadays to go abroad, particularly if difficult operations are required. Accordingly it would seem wrong to criticize the foreigner if he wishes to enter a European or American hospital, or at least to consult a doctor of his own country in times of sickness. We are, nevertheless, convinced that as development progresses foreigners too will gain more and more confidence in the Afghan hospital and its atmosphere.

2. The Provincial Hospitals

The *larger provincial capitals,* like Herat or Kandahar, also have their own hospitals for men and for women which, although they are old, are nevertheless equipped with essentials like x-ray apparatus, laboratory, operation theatre and dental ward and are thus viable. The Spinzar Hospital *(spinzar* = white gold, i. e. cotton) on the other hand is well equipped and was built by the Cotton Company in Kunduz; similarly the hospital in the new town of Lashkargah which I saw shortly before it was opened in 1964, impressed me with its up-to-date air. It is therefore obvious that the Afghan government is also effective in its support of the development of hospitals in provincial towns.

The number of *rural hospitals* in the *smaller places* has been increased to a degree such that every province has at least one hospital, albeit of only 10 to 20 beds. Admittedly the *older* of these hospitals are lacking in almost all forms of equipment. Operation theatres, laboratories and microscopes are absent and in some places only simple country buildings are available in

On the other hand *newly equipped provincial hospitals* are at times very well equipped. The hospital opened in Logar Province (Plate 13 d)in 1964 represents an example for the future development of such rural hospitals in the way in which its wards, out-patient clinic, operation wing, x-ray station and laboratories are laid out. The young Afghan doctors must be delighted to be able to work in such surroundings. In order that full-use of the apparatus and equipment available should be made, versatile and well-trained doctors are required.

Map No 4 shows the *location and distribution* of existing hospitals in contemporary Afghanistan. As is only to be expected the majority of hospitals and polyclinics is to be found in the densely settled areas of Kabul Province, in the east of the country and in the larger towns of Kandahar, Herat and Mazar-i-Sharif, which are also the most important development and reconstruction centres in the country. Those hospitals which have been newly erected in recent years are situated for the main part in economically important development centres like Lashkargah, in the Logar valley or in the Paktia Province. For the inhabitants of thinly populated mountain districts however, only a few small hospitals are available, so that in case of sickness the population of the central mountains will have to continue, at least for the meantime, to cover long distances on foot, on horseback or by donkey to reach the nearest surgery unless motor transport connections are close at hand.

The *total number of hospital beds in the country* was put at 1,654 in 1338 (1959/60) and 2,271 in 1343 (1964/65) [115, 133, 134]. According to the list given in Table V the country already has about 2,730 hospital beds [482]*. But in accordance with the uneven distribution of hospitals the relationship of hospital beds to the number of inhabitants varies considerably from province to province. Nevertheless, the developments of recent years demonstrate that the Afghan health authorities have done much to increase the number of beds in the provinces as well, and it is to be hoped and expected that this development of numerous schemes begun throughout the country will continue in the future.

IV. The Public Health Service

Until modern times the hygiene conditions were unsatisfactory [155, 202, 204, 399, 457] and these continue to be so in the old town quarters and in rural areas. The multiple contamination of domestic and drinking water as well as of foodstuffs openly exhibited in the bazaars, inadequate latrines and the lack of sewerage systems all favour epidemic outbreaks of numerous infectious diseases, the prevention of which is just as important as their combatting. Old traditions not only in the use of water but also in the sphere of eating habits and in the care of babies and small children do not present-day health service, their responsibilities and their methods will be briefly outlined in the following section. The methods taken to combat special infections, such as protection against smallpox (vide page 114) and the fight against malaria (vide page 100), tuberculosis (vide page 116) and cholera (vide page 108), will be discussed together with the description of the diseases themselves.

1. The "Mother and Child" Organization

The setting up of the "Mother and Child" organization *(rozantoon)* and its subsequent development with the help of generous aid from WHO and UNICEF, was undoubtedly one of the most important steps taken by the Afghan government towards the improvement of public health. The total ignorance of most women, especially the young ones, about taking precautions during pregnancy, deliveries in a squatting position which often lead to precipitate deliveries and grave ruptures of the perineum, the use of inappropriate manipulations to treat complications during birth or in cases of sterility [213], the unsterile work of midwives who in earlier times had not received adequate training, the swaddling of babies which when prolonged excessively could cause heat congestion and thus lead to the death of babies, unduly prolonged although generally still inadequate breast feeding and the ignorance of modern babycare and feeding methods—all these demonstrate how Afghan women, even in modern times, are bound by old customs and traditions which are frequently to the disadvantage of both mother and child.

It was the *task of the new organization* to effect a fundamental change in these matters: to advise women already during their pregnancy and to prepare for confinement, to carry out the delivery in accordance with modern and medically-approved methods, to instruct young mothers in babycare and feeding and at the same time to train midwives for service in the city and the provinces.

That such an institution would seriously interfere with old traditions was quite clear to its originators and it was also known to them that most women gave birth in their own homes and scarcely ever in hospital. In 1329 (1950/51) the organization started off with 6 beds only in the Shararah Hospital, one of the former municipal out-patient clinics. The first expert who was persuaded to undertake this task by the WHO was a Danish woman gynaecologist. She was indefatigable in her persistence in advising women, overseeing their deliveries, teaching mothers the correct way of applying baby napkins, how to feed them and also how to tend their own breasts and at the same time training the first midwives. The Shararah Hospital which had been altered and enlarged on several occasions in the intervening period developed in the course of years to become the centre of the *Rozantoon* Organization.

specialists under the aegis of UNICEF are available to give advice. If required operative obstetrics are carried out at any time; since a great number of women have a narrow pelvis, Caesarian sections are everyday requirements. Already in the 'fifties it was possible to raise the number of beds to its present level—that is 50 beds for deliveries and 15 for gynaecological cases—and the number of confinements increased from 104 in 1330 (1951/52) to 1,458 in 1342 (1963/64), while the total number of patients rose from 39 per year to 1,946 per year over the same period. Whereas in earlier years the great majority of deliveries in Kabul took place without any trained assistance, today about 30 per cent of all deliveries are carried out in hospital and another 20 per cent with the help of a trained midwife in the house of the pregnant woman. Fifty per cent of all deliveries do, however, take place without trained supervision and largely without even the most necessary hygiene measures [282, 386].

In the case of an uncomplicated delivery, a six-day stay in hospital is normal; during this period the mothers are instructed in those fields of babycare which were mentioned above and taught to sew baby clothing. After they have left the hospital the women are welcome to present themselves again with their babies in order to receive medical advice, milk and foodstuffs until the children are passed on to a pediatrician.

Before the war *midwives* were trained by a German head nursing sister in the women's hospital; now they take a 3-year course at Shararah Hospital. Up to the year 1964, 125 midwives had completed their training and of these, those who remained in Kabul for the main part stayed in their jobs once they had completed their course whilst those girls who lived in the rural areas generally gave up their jobs once they married.

Considering the difficulties which had to be overcome when setting up the entire institution, the success which has come after only a few years is bound to be a surprise and it is astonishing to learn that apart from the centre in Kabul, seven further advisory centres, albeit run only on an out-patient basis, have been opened recently. In addition to these, several *Rozantoon* units have been opened in hospitals in the larger provincial towns as well and these have been included as "maternity stations" in *Map No 4*.

2. The Vaccine Centre

In the 'thirties and 'forties the *Bacteriological Laboratory* in Kabul-Darulfunun which was then headed by Professor Berke, a Turkish bacteriologist, was producing vaccines against smallpox, cholera, typhus, paratyphus and rabies for the first time [202, 203]. Already at that time it was possible therefore to meet, at least in part, the danger of an epidemic by domestically-produced vaccines which were always distributed free of charge in order to control and protect against epidemics. By prothe institute. These were financed and implemented with the help of WHO and late in 1956 production of vaccines recommenced in what was now an enlarged and modernized *Vaccine Centre*.

Already by 1960 the new centre had produced about 2.7 million lots of vaccine for immunization against cholera [134]; in 1342 (1963/64) it had supplied smallpox vaccine for more than 2.85 million persons, together with about 300,000 lots of typhus vaccine and 56,275 doses of rabies vaccine (according to [134], 46,000 units as well as 60,000 ml of cholera vaccine [133, 134]). In 1965 another occasion arose which required that the vaccine centre should produce the vaccines needed to fight an outbreak of cholera in the north of the country. During the last cholera and smallpox epidemics in East Pakistan, the Kabul vaccine centre sent 100,000 lots each of cholera and smallpox vaccine to the affected areas [478]. Thus the institute—which has, incidentally, taken up the large-scale production of vaccine for veterinary purposes—has gained recognition and importance both inside and outside the country in a short space of time. Smith [478] quite rightly terms it "a national pride".

3. The Public Health Institute

The construction of a *Public Health Institute* in Kabul had already been planned in 1956 [386, 543]. It was intended to investigate the epidemiological characteristics of the diseases which affected the country and to train specialists needed for a public health service. The establishment was built with financial support of the WHO [532], as well as aid from the Federal Republic of Germany, and was opened late in 1962. The number of departments established shows how the scope of the institute's activities has already grown far beyond what was originally planned; it includes practically all essential aspects of a public health service. The institute is required to collaborate as closely as possible with hospitals and general practitioners in town and country and also with special institutions such as the Malaria Eradication Institute and the Tuberculosis Centre (Plate 14 a).

The establishment contains a *Microbiology Department* with divisions for bacteriology, immuno-serology, parasitology, entomology and haematology, a *Department of Biochemistry and Dietetics* with division for food testing, water analysis, medicament and drug testing as well as a division for bio-chemical work, and a *Department of Epidemiology and Disease Statistics* which analyses statistically and epidemiologically the reports on infectious diseases occurring throughout the country and thus provides a foundation for the fight against epidemic diseases. The *Mother and Child Health Department*—although not identical with the *Rozantoon* organisation although they are in close contact with each

added which is designed primarily for virological studies [7, 386, 543].

Since 1963 experts from WHO have been employed at the institute (Microbiology Department). Another group of experts, headed by a microbiologist from Hamburg until the beginning of 1968, has been delegated by the German Federal Republic and is active in the fields of food hygiene, veterinary virology, clinical chemistry and microscopy, drug testing, and—in collaboration with the staff of the "Deutsche Wasserwirtschaftsgruppe"—water analysis. The blood bank, too, was administered by a West-German specialist until 1965. Collaboration with the Institute of Hygiene in Hamburg has been confirmed by a mutual agreement, and its continuation is the concern of both partners. UNICEF contributed laboratory equipment, teaching aids, specialist literature and periodicals and in addition the WHO made thirteen grants to enable young Afghans to be trained overseas for eventual employment in the Afghan health service; four each were set aside for public health, epidemiology and laboratory technology and one for librarianship [543].

Of the numerous activities of the institute, only the *testing of water supplies* as one of major importance, will be singled out for special mention. Chemical analyses of water are undertaken in the Department of Bio-chemistry and Dietetics (Section of Water and Sewage), but bacteriological tests of domestic water can also be carried out as in the cases of Paghman water (vide page 81), of wells which have been bored in the town and suburbs and mainly supply surface water and of the water supplies which have been newly constructed as part of the expansion of the city [386]. The in part high percentage of Coli bacteria in the water, particularly in the bored wells, makes such controls absolutely essential from time to time. The dangers of infections, however, are far more often found in the open ditches which run across the city; their highly contaminated waters are intended for spraying the dusty roads, but are also used for sprinkling fruit and for washing lettuce and other raw vegetables.

Thus the institute has managed in a short time to fulfil an important role that points to future developments; it is also to be hoped that one day the wealth of material collected there may be scientifically evaluated. The report on the cholera outbreak of 1965 has already been analysed on the basis of information received at the institute [160] and shows how important is exact information on disease for the recognition of epidemiological relationships and thus for the fight against epidemics as well.

4. The "Red Crescent"

The Afghan organization equivalent to the Red Cross is the *Red Crescent (Afghani Sera Miasht* or the Afghan Red Moon); its headquarters are in Kabul, but a total and blankets as well as with direct financial assistance. The Afghan Red Crescent also maintains several medical consulting rooms in rural areas for people in need.

Once a year an information week with lectures, instruction and displays throughout the country encourages membership and elicits many donations towards this very important work of the society.

The Afghan Red Crescent maintains contact with the analogous organizations of the adjacent countries, as well as with the League of Red Cross Societies in Geneva, and continues to gain increasing significance in the maintenance of public health in the country [162, 386].

5. Industrial and Occupational Hygiene

The development of the country's young industry is already accompanied by the problem of *inspection by medical officers* and the care of sick workers and salaried staff. For years a hospital has been maintained for its employees by the Textile Company at Pol-i-Khumri, at Jabel-uz-Seradj and more recently at Gulbahar as well. The Cotton Company has built the new Spinzar Hospital (vide page 90), and the Ministry of Public Works as well as the Oil Company have set up small hospital wards near their work places (vide Table V). At Gulbahar not only homes but also a school, recreation centres and a mosque have been built for the welfare of the workers [75]. The effect is that the settlement around the textile plant at Gulbahar presents a modern, integrated scheme with a social stamp which may yet set an example for future developments of a similar kind.

With increasing industrialization, medical care and supervision in the industrial firms will certainly gain importance; although a Department for Occupational Hygiene has been maintained by the Ministry of Mining for years, planned protection from accidents in accordance with contemporary principles still requires further development and application to the numerous, small cottage industries.

6. Health Insurance

The first-ever health insurance was set up by the Banke-Millie in Kabul for its employees. In return for a small deduction from their salary it grants them free medical examination and treatment as well as a rather generous provision of medicaments. For years the bank employed a European doctor under contract for the treatment of its employees and their families and not until the 'fifties was he replaced by an Afghan colleague.

Industrial companies have arranged health insurance in similar ways, and the civil servants and employees of the various ministries are granted free medical treatment in return for a 3 per cent. deduction from their salaries [399]. Since salary deductions are small, but the price of medicines and especially the proprietary

The hospitals of the industrial concerns in Pol-i-Khumri, Kunduz and Gulbahar have been mentioned above.

7. Other Institutions

In recent years *medical care in schools* has made considerable progress. Children are checked for tuberculosis, malnutrition, avitaminosis and dental effects and protective vaccinations are also carried out [399, 457].

Kindergardens are open to children fromthe fourth year until they are of school age and before they enter the children are medically examined and remain under supervision. So far Kabul has two kindergardens set up with the aid of UNICEF, but another one was opened at Kandahar in the autumn of 1967. Milk powder, cereals, vitamin preparations and even soap are distributed free of charge by the welfare centre to those in need [457].

The *Workhouse* in Kabul *(marastoon)*, which in the first line caters for beggars, maintains workshops where the inmates are taught to perform simple jobs. A sick bay with 15 beds (vide Table V) and an out-patient medical service with regular supervision of the inmates and the treatment of patients is provided [457].

Orphanages are, by contrast, of little importance in Afghanistan to date since the marked sense of family ties among the Afghan population and the far-reaching relationships almost always provide children with a home in the close or extended kinship circle [155, 457].

On taking a final retrospective view of this outline of the major institutions connected with public health and welfare services—and granted that no claim is made that it is complete—, it is possible to recognise a very progressive development which has been fortunate in having made a successful start in recent years. WHO and UNICEF have contributed valuable impetuses in addition to personal and material aid. Together with indigenous trained personel their experts have pressed on with the establishment of the institutions already cited and have thus created most beneficial facilities. Understandably enough, if one appreciates the comprehensiveness of the plans, the problem of staffing has often presented more difficulties than the procuring of finance or the actual erection of buildings. It has to be remembered that the development of the country is necessarily being promoted in many fields at the same time and the training of reliable staff can scarcely keep pace with the speed of the present development. On the other hand a wide field of opportunity has been opened up for women in the health and welfare services since the abolition of the veil, and as young Afghan girls entering a profession are much inclined to take up social work it may be hoped that in the future sufficient candidates will be available for this important work.

C. The Diseases of the Country

The geographical-climatological review has shown that Afghanistan is an arid and in part semi-arid country. The barren mountain ranges, the arid steppes and deserts, the light alluvial soils of most fruit oases which are permeable to water, the fast-flowing mountain streams and the high degree of evaporation are all without doubt unfavourable to the spread of many infections and Afghanistan does not therefore comply with our idea of a "country of epidemic diseases". The natural features at least provide epidemiological conditions which are distinct from those in humid tropical lowlands. *The aim of the ensuing discussion will be to demonstrate the individual features in the spreading of diseases which are conditioned by the area.*

It is not intended to discuss all the diseases that occur in the country. Some are of no significance in geomedical analysis, others again are not sufficiently documented statistically. For such reasons only those diseases which are important from a geomedical standpoint—and they are in the main infectious ones—will be treated.

Attention has already been drawn to the necessity of making comparisons with geographically and climatologically homogeneous or at least similar adjacent countries in order that the unity of the entire Iranian-Turanian

WHO weekly reports which are, however, unable to give the complete figures of infectious cases for reasons already mentioned at an earlier stage. As a rule the reports only refer to the number of medically treated or hospitalized patients who, particularly in periods of epidemics, constitute only a fraction of the total infected. Only in recent times has the setting up of new provincial hospitals also led to a better statistical recording of individual cases. Small differences between weekly, monthly, quarterly or annual reports can be explained easily by the late entries of single suspected cases or by other corrections.

This limitation imposed on the evaluation of quantitative data is not decisive, however, since the aim of this presentation is not the absolute number of cases but rather the dynamic of epidemics. Even if the individual data available are not always exact, the additional tables and graphs still permit the reader to note whether a disease has increased or decreased in the period under review, whether larger epidemics have been reported, whether a special seasonal dependency of the occurrence exists and whether measures to fight epidemics which have been taken so far have fundamentally altered the position.

will differ from that in a surgical or dermatological clinic. In order to avoid being accused of one-sidedness in my assessment, I have sought to gain as broad a basis as possible for the evaluation of the geomedical characteristics of Afghanistan by drawing on the available literature, and, on the other hand, by exchanging experiences with other colleagues who were working in Kabul at the same time. Nevertheless, it is quite possible that one medical doctor or another may have made different observations within his field of activity, gaining thereby a picture of the disease cross-section in the country which differs from what it is described as being in the following.

I. Diseases Transmitted by Arthropods

1. Malaria

In Afghanistan one of the greatest problems, and at the same time one of the most successfully handled problems, of the entire health service is the fight against malaria. As early as the 19th century various authors [303, 417] pointed out the fact that malaria was widespread in almost all the inhabited areas of Iran and Afghanistan, and that both countries were part of the extensive western Asian malaria belt stretching from Turkestan across Iran-Turan to the Punjab, the malignant fevers of which were feared already in antiquity. But it was also highly probable that even during World War II and in the first years after the war malaria was the most widespread disease in Afghanistan [266, 474].

The basic features relating the *origin and character of malaria* may be taken as read. It is a protozoan infection caused by plasmodia which are transmitted from person to person by mosquitoes of the genus *Anopheles*. According to the type of agent three clinically differentiable kinds of malaria are recognised: malaria tertiana *(Plasmodium vivax* and very rarely, *P. ovale)*, malaria tropica *(P. falciparum)* and malaria quartana *(P. malariae)*. When biting the mosquitoes infect man with falciform germs *(sporozoites)* which will first develop into schizonts in the liver parenchymal cells of the host *(exoerythrocytic phase)*; later the products of segmentation *(merozoites)* pass into the blood stream where they invade erythrocytes *(trophozoites* growing into *schizonts)* causing the *intraerythrocytic* phase of the disease which is accompanied by shivering and rhythmic fever. Early or later in the course of the blood infection the formation of sexual forms *(gametocytes)* also starts and these are taken up again by the mosquito sucking from the parasite carrier. They develop by way of being oocysts until they are once again sporozoites—i. e. those parasitic forms which move into the salivary gland of the mosquito and are thus infectious, completing the cycle of infection.

parasites in the vector *seasonal malaria* only occurs during the warm months in the malarial areas of the temperate zones; in the tropical areas by contrast, malaria reigns *throughout the year.*

On the basis of the "parasite rate" or the "spleen rate" determined among the population (i. e. the percentage share of positive blood findings or verifiable spleen swellings among all persons examined), the intensity of malarial infection in individual endemic areas can be specified. In *hypoendemic* zones the spleen rate lies below 10 per cent, in *mesoendemic* zones it lies between 11 and 50 per cent, in *hyperendemic* zones between 51 and 75 per cent and in *holoendemic* zones perpetually above 75 per cent.

a) The Distribution of Malaria in Afghanistan (vide *Map No 5)*. It is difficult to give an exact picture of the distribution of malaria in Afghanistan before the fight against it began. Data from earlier times refer in the main to local outbreaks. During the epidemic of the year 1939 for example, we saw a total of 4,247 malaria patients in our out-patient clinics in Kabul; at times as many as 41 per cent of all patients were suffering from malaria [271]. It already became clear at that time that the Kabul plateau was an endemic area in which serious summer epidemics could well occur provided that conditions proved to be favourable. But apart from that there was no systematic inventory before the war which could have furnished information on the *de facto* distribution of the disease.

Some further information was made available through the observations of LINDBERG [366] which on the one hand showed that numerous settled areas in Afghanistan were infected by malaria in the late 'forties, and on the other hand provided the first data on the anopheline mosquitoes of the country. One WHO communication reported 99,849 cases of malaria in the period between January and June, 1949, which is the half of the year poor in malaria outbreaks [526, 527]; but there were no details on the type of infection or the infection rate in individual areas. So too in the immediate post-war years the picture of the distribution of malaria in Afghanistan remained similarly incomplete.

It was only with the systematic investigations carried out at the beginning of the 'fifties, which were intended as a basis for counter-measures against the disease [245, 273, 313, 441], that more exact information on the true distribution of malaria in the various provinces of the country was provided. As in neighbouring Iran, almost all inhabited and cultivated areas in Afghanistan up to a height of 2,000 metres were then infected. Although these areas are by this time largely clear of malaria they must still be regarded as "potential" fever areas. In restricted zones, as for example in the Faizabad district, malaria has been endemic even at heights of 2,500 metres [386], and from Ghazni too (2,222 m.), autochthonous cases of benign tertian malaria have, in former years, come to my attention. *In general, however,*

the Kabul Province like the Gardez District (spleen rate 7%) were still considered as hypoendemic. The arid areas in the west and north of the country, even those below a height of 1,500 metres, were largely hypoendemic zones and are presented as such in *Map No 5*.

Mesoendemic zones were mostly the medium altitudes below 1,500 metres, as for example the entire agricultural region in the Heri Rud valley (spleen rate 25%), locally restricted areas in Badakhshan (spleen rate 14.4%) and in the vicinity of Kunduz (spleen rate 33%), as well as in an extended zone marked by its climate and vegetation as a "steppe and semi-desert" (VOLK: vide page 76) lying to the west and south of Kandahar, as well as in the cultivated areas on the lower course of the Helmand river. At all lower and hence warmer altitudes and especially in the fertile agricultural areas, malaria formerly occurred *hyperendemically* and was a matter of great concern: such conditions occurred in the Eastern Province (Laghman 1949—spleen rate 76% and in single cases up to 91%), in the Kataghan Province which was one of the most dreaded malaria areas of that time (spleen rate 75%; Khanabad 50%) as well as around Qaleh-i-Bust (spleen rate 75.6%), and in the locality of the present Lashkargah and the agricultural area around it newly opened-up by modern methods of irrigation. *Holoendemic* malaria regions with a spleen rate permanently in excess of 75 per cent have, however, not been reported in Afghanistan.

Although it gives nothing but a schematic review of the distribution of malaria in earlier years, this compilation—which in its main features has been based on the accounts by RAO [441], DHIR and RAHIM [245] and on data lent by the Malaria Institute in Kabul—still shows that the density of infection depends in part on the altitude of places and in part on the landscape type. The densely-settled cultivated areas, especially the hot lowland zones, were infected to a considerably higher degree than the steppe regions which are thinly settled and poor in breeding sites. In addition the markedly accidented topography of the country, which conditions the situation of settlements and inhabited areas at very different altitudes in close proximity, also results in the closeness of areas with hyperendemic malaria and those with sparse infection—a situation which can be seen in the cartographic presentation *(Map No 5)*.

b) The types of malaria. The view that benign tertian malaria prevails in the highlands and subtertian malaria at the lower altitudes of Turkestan and the east of the country was already put forward in earlier work on the subject. In the unusually warm summer of 1939 we rated the proportion of tertian cases at about 70 per cent and those of subtertian infections at about 30 per cent in Kabul [271], but investigations carried out in the post-war years have produced more exact insights into the distribution of various types of malaria.

Plasmodium vivax dominates in all high altitude areas and is, contrary to our earlier opinion, probably encountered on frequent occasions but long, primary latencies in only a few instances where the infection had been picked up in the Kabul highland or at Ghazni. Blackwater fever is said to have occurred at times in conjunction with tertian malaria. The relapse rate of Afghan tertian malaria appears to be relatively low. In any case the annual graph shown below (Figs. 6 to 8) lacks the typical spring climax which is conditioned by late relapses.

Infection by *Plasmodium falciparum* is held to be by far the most common type of malaria in all lower-lying and therefore hotter malarial areas, as for example at Kataghan, Nangarhar, Girishk and Herat, and especially so towards the end of the infectious season from August until November [245]. In Sarobi (1,200 m.) our findings were in agreement with DHIR and RAHIM [245] and we observed infection by *P. vivax* predominate at the start of the malarial season and give way to subtertian infections later on [273].

The clinical records show all gradations from mild to grave malignant and even lethal forms; at times blackwater fever, which developed as a complication of subtertian malaria, was observed.

Mixed infections with *P. falciparum* and *P. vivax* seldom, occurred [245].

Isolated infections with *Plasmodium malariae* have been observed at Kataghan and in the Eastern Province district of Laghman [245, 441]; I saw no cases of quartan malaria in Kabul and Sarobi.

Plasmodium ovale has so far remained unknown in Afghanistan and its neighbouring countries. Isolated cases have been reported from the Lebanon [217], Israel [469] and Armenia [376], but *P. ovale* does not appear to be endemic anywhere in the Orient or Middle East.

c) The Afghan anopheline mosquitoes. A further condition for a successful campaign against malaria was, in addition to a knowledge of all malarial areas, as complete an inventory as possible of anopheline species living in the country, because this was the only way of tracing the decisive vectors and their habits. Following the setting up of the Malaria Control Service, planned entomological observations were undertaken, the results of which have been chiefly collated in the work of RAO [431], DHIR and RAHIM [245] and IYENGAR [313]. They formed the point of departure for the subsequent measures taken against malaria.

Map No 6 gives a representation of all those *places* known to us where *anopheline mosquitoes* have been recorded, but it should be remembered that the places marked represent larger areas in the vicinity of such places. In addition we have included the most important finds of anopheline mosquitoes from the border provinces of neighbouring countries in order that a comparison between the Afghan species discovered and those of geographically and climatologically similar border areas may be made. West Pakistani findings were so

made lie outside the area covered by our map sheet, as well as the rare finds of *A. algeriensis* which, therefore, have not been considered.

Another difficulty occurs when classifying certain species of *Anopheles* in geographical-faunistic groups: *A. pulcherrimus*, for example, is called a Mediterranean species by MULLIGAN and BAILY [392] as well as by COVELL [230], whereas W. FISHER [274] calls it an oriental one. In the following list we distinguish palaearctic, Mediterranean, Indian or Oriental-Indian and Indian-Alpine species, thus following the classifications employed by COVELL [230, 231], FOOTE and CROOK [276] and by WEYER [512] in their main divisions.

In the first instance DHIR and RAHIM [245] found 16 species of anopheles in Afghanistan; later a 17th species, *A. habibi*, was confirmed. If anopheline mosquitoes living in border areas of neighbouring countries are taken into consideration as well, 25 species are counted in the Afghan area, the Iranian-Turanian border district and Baluchistan together with the North West Frontier Province. They will be described below in alphabetical order.

1. *A. annularis* V. D. WULP 1884. An Indian species which is common all over the Indian, Malayan and south Chinese lowlands, but rare at higher altitudes. It is found in *Afghanistan only to the south of the Hindu Kush* near Laghman (650 m.) and also sporadically near Kabul (1,803 m.). It is frequent in the Pakistan border areas. It breeds in pools with dense vegetation, as well as in rice fields; its contact with man is variable and it is not known as a vector in Afghanistan [181, 225, 230, 245, 276, 396, 429, 430, 432, 441].

2. *A. claviger (bifurcatus)* MEIGEN 1804. Palaearctic species; spread from Europe across northern Iran, Turkestan to the Pamir, even at altitudes above 2,000 m. It is found *in Afghanistan only north of the Hindu Kush* near Kunduz and Khanabad. It breeds in cool, flowing, even shaded waters. In Afghanistan it is unknown as a malaria vector but is said to have played a role as vector in some mountain valleys of Turkestan and Kazakhstan. Sub-species have not been reported in the Afghan findings [199, 245, 251, 276, 293, 298, 416].

3. *A. culicifacies* GILES 1901. An Oriental-Indian species; widely distributed throughout southern Iran, Baluchistan and the whole of central India. Predominant in plains and rarely at higher altitudes up to 2,000 m. *In Afghanistan only south of the Hindu Kush* near Laghman, Kunar and Kabul. Frequent in West Pakistan from Quetta to Peshawar; in south east Iran near Zahidan but not further north than Birjand. It breeds in ditches, pools, river beds and rice fields. Adult mosquitoes are house-bound. The most important of all vectors in northern and central India, but *in Afghanistan only proved as a vector near Laghman* [163, 181, 221, 222, 224, 225, 245, 251, 252, 308, 309, 313, 396, 429, 430,

5. *A. fluviatilis* JAMES 1902. An Oriental-Indian species. Abundant from Arabia to West Pakistan and India. In Kashmir up to altitudes of 2,500 m. *In Afghanistan only south of the Hindu Kush* near Laghman and Kabul; in West Pakistan from Quetta to Peshawar. It breeds in river beds and overgrown ditches. Adult mosquitoes are house-bound. In India at times an important vector; insignificant in Afghanistan [181, 221, 230, 245, 251, 276, 314, 396, 430, 432, 441].

6. *A. gigas* GILES 1901. Oriental-Alpine species. In West Pakistan and northern India up to altitudes of 2,500 m. Epidemiologically insignificant. *Unknown in Afghanistan;* in West Pakistan near Rawalpindi and Malakand [225, 231, 430].

7. *A. habibi* MULLIGAN and PURI 1936. Best grouped with the Mediterranean species. Sporadic from Baluchistan to India; sporadic only in West Pakistan near Quetta. *Found on only a single occasion in Afghanistan near Kunduz north of the Hindu Kush.* Breeds in irrigation ditches with fresh water. Adults outside houses in qanats. Epidemiologically insigificant [386, 392].

8. *A. hyrcanus* PALLAS 1771. Despite wide distribution even in southern Europe it is counted among the Oriental-Indian species. From the Mediterranean area across the Balkans, Asia Minor, Iran, Turkestan and India to China, Japan and South East Asia. *In Afghanistan occurring only sporadically north and south of the Hindu Kush (var. pseudopictus and var. sinensis);* also in neighbouring districts of West Pakistan, southern Iran, and Uzbekistan. Breeds in swamps and rice fields. Adults house-bound to a slight degree. Unknown as a vector in Afghanistan [181, 199, 215, 230, 245, 251, 273, 290, 298, 336, 365, 396, 416, 432, 512].

9. *A. lindesayi* GILES 1900. Oriental-Alpine species. Sporadic in West Pakistan and northern India, but also in southern Turkestan. *Unknown in Afghanistan.* Breeds in pools of mountain streams; epidemiologically probably completely insignificant and it is predominantly an outdoor mosquito [213, 230, 396, 432].

10. *A. maculatus* THEOBALD 1901. Oriental-Indian species. Found at higher altitudes up to 1,500 m. in India and South East Asia. *In Afghanistan south of the Hindu Kush only;* in West Pakistan on the southern edge of the border mountains. Breeds in non-stagnant pools in river beds. Not a vector of malaria in Afghanistan, but known as such in the eastern Himalaya [225, 230, 276, 396, 430, 432, 495, 512].

11. *A. maculipennis* MEIGEN 1818. Palaearctic species; from western Europe to eastern Asia. Important vector of malaria in the temperate zones. In northern Iran from Azerbaijan to Khorassan and Turkmenistan *(A. mac. typicus* and *A. mac. subalpinus)* and in Turkmenistan *(A. mac. messeae).* Also encountered up to Khuzistan in Iran, and at medium altitude in Iraq. South of the Hindu Kush and *throughout Afghanistan it is unknown.* [174, 219, 251, 284, 321, 335 a, 339, 395, 416, 495, 506, 512, 552].

gu. *In Afghanistan only south of the Hindu Kush* near Laghman, but not at higher altitudes. Breeds in pools and river beds. Not confirmed as a malaria vector in Afghanistan [245, 276, 396, 432, 441].

14. *A. multicolor* Cambouliu 1902. Mediterranean species; from North Africa across Asia Minor and Iran to north west India. *In Afghanistan only south of the Hindu Kush* near Kandahar and Girishk; in West Pakistan near Quetta and Fort Sandeman. Breeds in pools and ditches. Adult mosquitoes to some extent house-bound. Not known as a vector in Afghanistan [232, 245, 392, 429, 430, 441, 512].

15. *A. nigripes (plumbeus)* Staeger 1839. Palaearctic species; from Europe to Caucasia; in Azerbaijan, the Caspian regions, Tajikstan and also sporadically at higher altitudes in the Punjab. The only Palaearctic species known in West Pakistan. *In Afghanistan, however, it is unknown.* Breeds mostly in tree cavities, not in open waters. An outdoor mosquito, insignificant as a vector [174, 219, 225, 230, 298, 321, 333, 335 a, 512].

16. *A. pallidus* Theobald 1901. Oriental-Indian species; frequent in the Central Provinces but only sporadic in West Pakistan near Kohat-Hangu and Rawalpindi. *Unknown in Afghanistan and never found north of the Hindu Kush.* Breeds in pools and ditches. In India at times a vector; in West Pakistan probably insignificant [230, 335 a, 429, 430, 512].

17. *A. pulcherrimus* Theobald 1902. Mediterranean species; from Syria by way of Iraq to Turkestan, Turkmenistan, Kazakhstan and northern India. *In Afghanistan north and south of the Hindu Kush,* also found in West Pakistan. Breeds in pools and ricefields. Unknown as a vector in Afghanistan, although it is known to be such in Turkestan (Murghab) [174, 181, 219, 230, 245, 251, 298, 365, 386, 396, 416, 432, 441, 506, 512].

18. *A. sacharovi* Favre 1903. Subspecies of the maculipennis group; Palaearctic-Mediterranean species. From Europe across Asia to Sinkiang. *Only north of the Hindu Kush in Afghanistan;* only breeding place located at Dand-i-Ghori in Kataghan Province. Also in northern Iran, Azerbaijan, Uzbekistan, Urgut and Syr-Darya. But remarkably enough, in the Shatt-el-Arab district in Iraq. Breeds in pools, river beds, ricefields and in brackish water as well. In west central Asia considered to be a vector in many places; in Afghanistan insignificant and no longer reported in recent times [251, 260, 298, 321, 333, 335 a, 365, 370, 386, 416, 504, 506, 547, 552].

19. *A. sergenti* Theobald 1907. Mediterranean species. From North Africa across Asia Minor to West Pakistan. *Unknown in Afghanistan;* in Baluchistan sporadic round Quetta. Breeds in ricefields, ditches; the adult mosquitoes are frequently housebound. Its role as a vector has been variably assessed [221, 225, 274, 276, 286, 365, 512].

20. *A. splendidus* Koidzumi 1923. Indian species. Nearer India to eastern Asia in plains and at altitudes Pakistan and southern Iran. Closely linked with human settlements; a vector and particularly feared in the alluvial river plains of western Asia; so far epidemiologically insignificant in Afghanistan [163, 181, 221, 225, 230, 245, 273, 309, 313, 335 a, 365, 370, 392, 396, 424, 430, 432, 441, 495].

22. *A. subpictus* Grassi 1899. Oriental-Indian species. Distributed throughout nearer and further India as well as further afield. *In Afghanistan only south of the Hindu Kush,* near Laghman, Kunar and Kabul; in West Pakistan from Quetta to Peshawar. Breeds in pools and ditches, even in contaminated waters. Adults found in stables and houses. In India where it occurs in large numbers it is regarded as a vector, but it is without significance in Afghanistan [181, 221, 245, 313, 396, 441].

23. *A. superpictus* Grassi 1899. Mediterranean species; from southern Europe to West Pakistan, especially in arid and semi-arid areas and at high altitudes. *In Afghanistan it is found north and south of the Hindu Kush and is widely spread throughout the country.* In West Pakistan from Baluchistan to the Punjab, also in Turkestan (Rushan District), Tajikistan and in the western Pamir mountains (Vanch District) up to a height of 2,600 m. Breeds in pools on the side of mountain streams and at times in rice fields as well. Adults are partly house-bound; extensive flying range of up to 6 kilometres. Greedy blood suckers. *In Afghanistan, as in many neighbouring areas, the most important and practically the only important vector* [163, 174, 199, 219, 221, 230, 245, 251, 267, 273, 298, 335 a, 365, 366, 370, 386, 392, 396, 416, 424, 432, 441, 507, 512, 550 inter alia].

24. *A turkhudi* Liston 1901. Oriental-Indian species; scattered in West Pakistan and south east Iran as well as *in Afghanistan where it was found south of the Hindu Kush only,* albeit not recognized as a vector [163, 174, 221, 245, 308, 309, 392, 396, 430, 441].

25. *A. vagus* Dönitz 1922. Oriental-Indian species; distributed over India and South East Asia. *In Afghanistan only south of the Hindu Kush,* near Laghman; in West Pakistan and southern Iran hitherto unknown. Breeds in pools and irrigation ditches as well as in swamps. Almost everywhere it is epidemiologically insignificant. Not regarded as a vector in Afghanistan [230, 245, 441, 512].

This compilation of anopheline mosquitoes reported from Afghanistan and the border areas of the neighbouring countries, as well as the cartographic record of the localities in which they have been found *(Map No 6),* show that Indian (i. e. Oriental-Indian), Palaearctic, and Mediterranean species meet up in Afghanistan and that the areas of distribution of many species overlap within the country, whilst other species and forms occur only in the south or north of Afghanistan.

The *Indian* and *Oriental-Indian* species *A. annularis, A. culicifacies, A. fluviatilis, A. maculatus, A. maghu-*

ever, it is completely absent. *A. hyrcanus* which has been recorded both north and south of the Hindu Kush, occupies a special position in the field—due to its extensive distribution from the Mediterranean to the Far East—, and the question must be asked whether this species should be counted among the Oriental group as has hitherto been the case.

The few *Palaearctic* species recorded in Afghanistan have only been traced north of the Hindu Kush; but outside the country, *A. nigripes (plumbeus)* has been found in the mountains of the Punjab and *A. sacharovi* has been found in southern Iran and Iraq in the Shatt-el-Arab district as well. Nevertheless, the findings to date suggest that practically no Palaearctic species of *Anopheles* are to be found south of the Hindu Kush.

Thus the Hindu Kush presents a faunal frontier in Afghanistan between Oriental-Indian and Palaearctic species of Anopheles living in the country. This is a fact which to my knowledge has as yet not been pointed out, although where other manifestations are concerned, it is well known to zoologists in examples such as the respective home areas of the single-humped and double-humped (Bactric) camel and to botanists in the distribution of arboreal vegetation; it can also be recognized in epidemiology in the manner in which cutaneous leishmaniasis is spread (vide page 102). The dividing line between the areas of distribution areas of both groups of anopheline mosquitoes as recorded in *Map No 6*, evidently runs from E.N.E. to W.S.W. across the high mountains and can be traced as far as eastern Iran, while in central and western Iran, where there is no separating range of mountains, the distribution areas of different related groups show considerable overlap.

Of the four *Mediterranean* species occurring in Afghanistan, only two, *A. superpictus* and *A. pulcherrimus*, are found throughout the country—that is, north and south of the Hindu Kush. In the neighbouring countries in the north west, west and east, the area of distribution of the Mediterranean *A. superpictus* extends far into the vegetation domain of Indian as well as Palaearctic species, so that Mediterranean species appear to occupy the largest distribution zones in the entire Iranian-Turanian area; this points again to the fact that the fauna of the Middle East contains Mediterranean traits as well and that even the Afghan anopheline mosquitoes ought to be seen in conjunction with those of homogeneous or similarly configured contiguous territories.

In addition there are some Mediterranean species *(A. d'thali, A. marteri, A. sergenti)*, some Oriental-Indian species *(A. pallidus)* and Oriental-Alpine species *(A. gigas)* represented in West Pakistan which are lacking in Afghanistan. If in certain earlier studies [286, 316], the northern limit of the distribution of Oriental-Indian anopheline mosquitoes was placed in the vicinity of the Indus frontier or of the Afghan-Pakistan border mountains, this assumption can only refer to individual species like *A. gigas* and not claim any overall validity; in any

Small *pools in dry river beds* with low current velocity, limited vegetation of algae and, consequently, clear water, which are exposed to the sunlight are the breeding places preferred by *A. superpictus* (Table 15 c, 16 a and d) [245, 273, 313, 370, 441, 512]. They are to be found alike in all malaria areas of the country, and since these breeding places only materialise after the snow-melt in the high mountains and after the ending of the spring rains when the rivers dry out, the larvae of *A. superpictus* can develop not before June, i. e. during the dry summer season. The breeding season sets in swiftly at the start of the dry season and comes to an equally abrupt end in autumn (Fig. 6), *(back of Map No 5)*.

Rice fields are less frequently inhabited by *A. superpictus*, unless the adjacent riverbeds have almost completely dried out and furnish next to no breeding pools—a situation which we observed in the Heri Rud valley east of Herat in 1964. At an earlier date we did find sporadic larvae and egg deposits of *A. superpictus* in rice fields in Sarobi, but these were almost exclusively at the water intake and outflow openings, where a stream flow existed and which resembled the biotopes naturally preferred, at least in part, by the species.

The season of the *adult mosquito* (see Fig. 6) begins in July and ends in October when the females withdraw to hibernate [313]. The question of the degree to which *A. superpictus* is housebound has been answered in differing ways. Iyengar found the species in inhabited rooms in Kabul even during the daytime but stressed, however, that humidity was 10 to 30 per cent higher there than in shady places out of doors. In Sarobi, however, a warmer and drier place, *A. superpictus*, could scarcely ever be encountered indoors during daytime; the species would appear to live as a guest mosquito, entering only at night for the purpose of sucking blood, but spending the day in shady places outside these buildings; in the Laghman and Herat districts we found *A. superpictus* in dark, open stables or out of doors in the cracks of walls during the hours of daylight; we never discovered them in occupied rooms (Plate 16 b and c). Similar observations have been reported from Iraq, Iran and Syria [370]; the varying degree of attachment to the house probably depends on local and microclimatic peculiarities and above all on humidity in particular areas.

The *sporozoite rate* among adult females of *A. superpictus* has varied a great deal in the Afghan areas investigated. Before the malaria campaign had started it amounted to 0.4 per cent in the hyperendemic Eastern Province, to 0.17 per cent in Kataghan, to 0.39 per cent in Kabul and to 0.26 per cent in Sarobi [245, 273, 313, 441], but even in areas of the country with lower endemicity it was sufficiently high to keep the infection in balance under the given climatic peculiarities and the close contact between mosquitoes and man.

In addition Rao [417] reported in 1949 that *A.*

cular ricefields, which happen to be numerous in the Laghman region [232, 430, 441]. Since ricefields are kept continuously irrigated for a period of 120 to 160 days after planting [86], they offer a favourable biotope for *A. culicifacies* and other ricefield breeders at precisely the right season for the mosquitoes.

Irrigation ditches of the older type *(jui;* in Iran *jub* at times) (Plate 11 b) and especially overgrown ditches the bank edges of which have been neglected may certainly serve as breeding grounds for some species of anopheline mosquitoes if they carry water at all times. They have, however, been of little importance for the development of Afghan malaria vectors and we scarcely ever found larvae in them.

A. stephensi has not been found to be infected in Afghanistan; in the alluvial river districts of the Shatt-el-Arab and in the Indus region [370] in West Pakistan it is a dreaded vector, but in the arid highlands it is relatively rarely represented and may, if at all, be considered a "potential" malaria vector. The breeding biotopes resemble those of *A. culicifacies* and in the Eastern Province of Afghanistan *A. stephensi* appears to be predominantly a ricefield breeder.

All other species recorded in the list from page 97 to page 98 and in *Map No 6* do not act as vectors in Afghanistan and are therefore of no account epidemiologically speaking.

e) The yearly course of malaria. The fact that *A. superpictus* is the decisive vector throughout Afghanistan appears to be significant in the interpretation of the epidemiological picture of malaria. Since *A. superpictus* occurs only during the summer months, the *infection period* must be seen to fall in the months July to September [245, 313]; the result is seasonal malaria, the course of which, when shown diagrammatically, follows the season of the anopheline mosquitoes vector with a delay of about two months, and—a characteristic of the arid highlands of the Middle East—it is always a *malaria of the dry season* which only attains its full spread when the summer temperatures have already passed their maximum; it lasts for a few months only and falls away rapidly in October or November (Figs. 6 to 8; see back of *Maps No 5 and 6).* Thus the arid highland together with the arid climate provide the conditions for the establishment of a vector species adapted to the environmental factors which in turn determines the epidemiological picture of malaria.

Although *A. superpictus* in many places is but little house-bound, the spread of malaria is not impeded by this. On the one hand mosquitoes enter the living quarters at night to suck blood from man, and on the other the spread of the infection is made possible or even facilitated by the habit, which is common throughout the Middle East, of sleeping outdoors. The chain of infection is closed by the habits of the people—in themselves conditioned by climate—and the epi-

malaria transmitted by *A. superpictus* rages in the dry season [365, 370, 424], while in India, which enjoys a high precipitation which in turn provides different geographical and climatic conditions which thus attract different species of vectors, malaria can be found throughout the year, albeit with a marked increase in the period of monsoon rains. Thus the analysis which has been carried out shows that *Afghanistan together with the remaining Iranian-Turanian highland represents a unity not only from the geographical-climatological point of view—as has hitherto been discussed—but also, as far as malaria is concerned, with regard to her geomedical and epidemiological features.*

f) The anti-malarial campaign. As early as 1948 a first malaria control service had been started in Kabul, which, despite limited staff to begin with, embarked on the "*preparatory phase*" of the malaria campaign—that is, on the entomological and epidemiological inventory. But at an early stage the unforeseen extent of these projects necessitated the setting up of a considerably larger organization, and this was done with WHO aid. In 1949 the *Central Malaria Institute* was founded in Kabul, the urgent task of which was to train the entomologists, the laboratory workers and the technicians required for the campaign and to put them into action in malaria areas [245, 252, 386]. Since that time the institute has been continuously advised by a malariologist of the WHO attached to the Regional Centre in New Delhi (Plate 15 a).

Regional Headquarters, malaria units and sub-units were then set up in the most endangered areas and at the present time there is one central institute, three regional headquarters and 23 units and sub-units available in Afghanistan; these are recorded in *Map No 6.* The regional headquarters (Plate 15 b) are headed by a malariologist (medical doctor) and—according to the number of population in the area to be attended to—staffed by a specialist entomologist, 5 to 13 inspectors, 1 to 4 insect collectors, 5 to 13 technical assistants, 20 to 50 insecticide sprayers and a further 10 to 16 labourers and other employees. The programme requires that each inspector continuously supervises an area inhabited by 10,000 people [252]. With this establishment the conditions for the start of the "*attack phase*" (lasting as a rule for 3 to 4 years) had been provided. The aim is to interrupt the transmission of malaria in the country and to severely reduce the reservoirs of parasites in the population.

Work was started in the hyperendemic malaria areas of Laghman and Kunar where the first 8,000 people could be afforded protection in 1948; it was then extended to Pol-i-Khumri, where high absenteeism among the workers due to subtertian malaria was at times a serious threat to the textile industry; in the following years the Kunduz, Kandahar and Herat districts were also included in the "attack phase". The number of people

with choloroquine and primaquine as a precautionary measure.

At the same time the *campaign against vectors* in living quarters and breeding places was commenced. In the *country*, after initial difficulties, members of the anti-malaria squads soon gained access to private houses and were able to spray the interiors and stables with aqueous suspensions of DDT (1 gr./m² of wall). But because the effect on *A. superpictus* in these rough mud walls was proved to fade after 10 to 12 weeks [475], the applications had to be repeated at the appropriate intervals. In addition the biotopes of the larvae were sprayed with oily solutions of D.D.T. throughout the entire breeding season.

In *urban residential areas*, however, insecticide sprayers were refused access to dwellings for a much longer time in some places. The effect was that in many areas at the outset the repeated D.D.T. treatment was necessarily confined to larvae biotopes [245, 252].

The *cost of the programme* was relatively low; for the treatment of the larvae alone they amounted to 0.5 Afghani (0.02$) and for the combined spraying of breeding places and indoor areas to about 2.7 Afghani (0.12$) for every person in the country [252].

The results were surprising; after only 3 to 4 years malaria had diminished in almost all endemic areas as demonstrated by the following changes in the spleen and parasite rates [245].

Place or province	Spleen rate in % before campaign			Parasite rate in % before campaign		
	%	(year)	1953	%	(year)	1953
Pol-i-Khumri	76.0	1948	11.0	14.2	1948	0.55
Baghlan	74.7	1951	24.7	23.5	1951	3.3
Khanabad	47.6	1950	20.5	9.9	1950	1.7
Taluqan	60.3	1951	14.6	8.1	1951	0.0
Laghman	76.2	1949	9.0	18.5	1949	0.0
Kandahar Prov.	46.0	1952	22.0	13.1	1952	9.3
Khost	65.6	1952	19.5	?	1952	3.1
Kabul	21.0	1951	10.0	13.4	1951	0.55
Sarobi	58.0	1951	10.0	22.5	1951	1.6

Already by 1953, numerous former hyperendemic and mesoendemic malaria areas could be considered as having reached the *consolidation phase* in which the remaining reservoirs of parasites were to be eliminated. In the year 1962, that is fourteen years after the campaign had been started, about 2 per cent—and in the summer of 1963 already 11 per cent—of the population lived in areas under consolidation with a parasite rate of only 0.01 per cent; the total number of malaria cases reported in the country was 661 [526]. In 1965 (19.2 per cent of the population under consolidation), 33 small autochthonous foci of malaria were recorded; in the areas under consolidation the parasite rate amounted to 0.06 per cent, and at the time of my last visit to Afgha-

In their former areas the anopheline mosquitoes are also only to be met in small numbers. *A. superpictus* appears to have been almost completely eliminated in many places; because it has not developed any discernible resistance to insecticides so far, the success of indoor spraying has been good despite the fact that the mosquitoes display little attachment to dwellings. In principle, however, neither *A. superpictus* nor *A. stephensi* nor any other species can be regarded as completely exterminated. It is in any case not the aim of anti-malaria measures to eradicate all anopheline mosquitoes in the country; it ought to be possible to attain a tolerable "anophelism without malaria"—i. e. the number of vectors should be reduced, since the parasite rate has also been decreased markedly, to such a degree that malaria will no longer remain in equilibrium in the long term but retreat more and more.

In spite of the most fortunate results in the areas under consolidation, the last part of the programme—the maintenance phase—which amounts to no more than mere supervision, should not be introduced too early. The possibility can by no means be excluded that there are foci of malaria in remote mountain valleys which have been overlooked and it is quite well possible that malaria would spread from such isolated foci to other areas. Local outbreaks of malaria must be expected every now and then, and especially so on building sites where numerous people live together at close quarters without sufficient protection from mosquitoes. Malaria has in large part been suppressed in Afghanistan, but it has not died out and among 640,000 blood tests carried out in 1966, 2,320 were found to be positive, so that there are more cases than had been supposed in previous years [386].

Besides this, as *A. superpictus* has become almost epidemiologically inert in many areas, the possibility cannot be excluded that other species of anopheline mosquitoes, which were hitherto less anthropophilic, will adapt to man. In my opinion it is not inconceivable that one day *A. stephensi* or one of the other Oriental-Indian species of vectors which has so far remained epidemiologically unimportant, will take over the role of a malaria vector in southern Afghanistan. For that reason further supervisory projects should bear in mind the possibility of a "change of vector".

In connection with the anti-malaria campaign, special attention has recently been drawn to the *movements of nomads* in Afghanistan as well as in West Pakistan, who are certain to be *potential malaria disseminators*—a fact which is countered by the Afghan Malaria Service by the setting up of check points at the most important crossing points on the frontier [386, 435].

Mecca pilgrims are scarcely likely to present a continuing and serious epidemiological problem since, compared with earlier times, the modern way of travelling has greatly reduced the chances of infection. On the

health authorities have included malaria control among their duties [261].

The Afghan Malaria Service reckons to have malaria completely eradicated by 1972 [386]. Already now the institution in close cooperation with Afghan malariologists and WHO experts has tackled one of the greatest disease problems of the country with unusual success, and should it be possible in the future to carry on with the programme in an equally effective manner, it may have real hope of achieving this aim.

2. The Leishmaniases

These are infections caused by protozoa of the genus *Leishmania* (Flagellata), which are transmitted by *Phlebotomus* flies (Psychodidae; sandflies). Thus the distribution of the disease is tied up with the vegetation zones of the vector insects. In the Old World two kinds of leishmaniasis are known; the *visceral* form, *Kala-Azar (L. donovani)*, a serious general infection accompanied by fever, anaemia, enlarged spleen and liver, and the localized cutaneous leishmaniasis or *oriental sore* (known also as Bagdad boil; *sāldānăh*, سالدانه i. e. one year sore, in Kabul) *, which, if left untreated, usually disappears after a year.

a) Distribution in the Country. The *oriental sore*, the only leishmaniasis which occurs in the country, has for a long time been endemic in many areas of Afghanistan [413]. In Herat and Kandahar, as well as in Kabul and in the east of the country, we saw numerous cases and the disease also appears to occur frequently in the Afghan-Turkestani areas—in some parts among 30 to 50 per cent of the children according to CUTLER [234]. Probably the entire inhabited territory in Afghanistan up to an altitude of 1,800 metres—we encountered neither autochthonous cases nor sandflies above this height—is affected. It thus belongs to the extensive endemic area stretching from Asia Minor across Iran into the Soviet Central Asian republics and West Pakistan, which includes almost the entire arid and semi-arid zone of western Asia [413].

During the years immediately following the war the endemic area appears to have expanded in Afghanistan. Before the war, for instance, there were practically no endemic oriental sores in Kabul but some sporadic occurrences in Dehmasang, an old quarter of the town; the remaining parts of the town and the surrounding villages were free [266, 319 a], and the majority of our patients with oriental sore came from the endemic areas in the west and south west of the country. During the first years following the war, however, the number of autochthonous cases increased greatly—and this was true for Kabul as well—and the disease spread over the entire municipal area and into the villages of the environs. This was most likely due to the fast growing traffic from place to place and from endemic areas to the capital where there were numerous sandflies during the exposure to it were relatively limited, with the consequence that the majority of inhabitants were not infected in infancy and thus immunized for later years, as is the case in strongly infected areas.

b) Forms of the disease. As in Iran and the neighbouring Soviet republics, so also in Afghanistan cutaneous leishmaniasis occurs in *two forms which are clinically and epidemiologically distinct* [177, 253, 352] and the parasite strains must also be regarded as different [272] since they do not have a cross-immunization effect upon one another. In the north of the country, just as in the areas beyond the Amu Darya [468] and in northern Iran [177], the so-called *rural* or *moist* form predominates and occurs chiefly in rural areas. After a short incubation period which at times lasts only ten days, it develops quickly and brings on severe ulceration which in most cases takes several months to heal. In a manner similar to conditions in Iran, the west, south and east of Afghanistan manifests only the *dry* or *urban* form. This is characterized by a remarkably long and irregular incubation time which may last several weeks or even months, by crusty scabs and by the but slowly progressing development of ulcers; as a rule it heals up after one year, but some isolated cases lasting for several years have been reported [272].

In Kabul *seasonal fluctuations* in the frequency of fresh infections were not observed by us in the case of the dry forms of oriental sore with its irregular incubation period. Although patients attended sessions in our out-patient clinics at all seasons of the year, the inaccurate anamnestic statements did not permit any conclusions to be drawn concerning the true onset of the disease. The moist form, on the other hand, thanks to its short incubation time, allows what in many places is a marked seasonal relationship, in which there is an increased frequency of new cases during the summer months, to be clearly recognized [175].

c) Epidemiologically both forms of the oriental sore differ most significantly. The *rural* or *moist* form, endemic north of the Hindu Kush, in northern Iran and beyond the Amu Darya, primarily appears to be a zoonosis of subterranean rodents. The most important animal reservoir, according to Soviet and Iranian researchers [175, 255], is the racing mouse *Rhombomys opimus* LICHT (Gerbillidae), the population of which was infected with *L. tropica* to an average degree of 30 per cent (2.3% in May, 56.3% in late summer) in the Murghab valley [351, 352, 353]. Similar findings were made in Tajikistan (infection rate 35.5%), while *Meriones erythrourus* GRAY and *Spermophillopsis leptodactylus*, both of them typical representatives of the desert fauna, were much more rarely infected (Mer. erythr. 6.7%) [413, 468] and thus represented a reservoir of subordinate importance.

Large numbers of *sandflies* were found chiefly in the rodent burrows; in south west Turkestan the species

the Phlebotomus species mentioned are predominantly zoophilic species, the assumption is justified that the infection with *L. tropica* is a zoonosis which is spread among the rodent population by infected sandflies; the observation that birds nests can also serve as an abode for sandflies does not contradict this assumption [410, 411].

Near human settlements the rate of infection is higher among rodents and sandflies alike than in uninhabited areas [249, 468]; *P. papatasii* (infection rate up to 19.2%) and *P. arpaclensis* appear to favour particularly the connection between rodent burrows and human homes and must therefore be considered as the most important vectors of cutaneous leishmaniasis from animal reservoirs to man in the Turkmen and Uzbek areas. A reverse transmission from man to rodents might be conceivable but has so far remained unproven; apparently the chain of infection can be maintained within the rodent population by the zoophilic species, and above all by *P. mongolensis* and *P. caucasius* as well as by *P. arpaclensis* [243, 249, 468].

In the loess-covered hilly regions and steppes of northern *Afghanistan* which geographically, climatically and faunistically correspond in large part with the areas lying beyound the Amu Darya at altitudes of 400 to 800 metres, *Rhombomys opimus* appears to be the most important animal reservoir, as it was found to be infected to the extent of 60 to 80 per cent in inhabited oases [253, 254]. Unfortunately no systematic investigations have so far been produced concerning the sandflies of Afghanistan, but on the basis of the research results cited it may already be suggested that the epidemiological connections are very similar to those in the endemic areas north of the Amu Darya—that is to say that in northern Afghanistan too, the rural form of cutaneous leishmaniasis is a zoonosis of rodents which is transmitted to man by sandflies.

The *dry* forms of cutaneous leishmaniasis must, epidemiologically speaking, be assessed differently. In the rocky areas of south west Afghanistan there are apparently no zoonotic leishmaniases. Here animal reservoirs are unknown, so that the chain of infection obviously leads directly from man to sandflies to man. Even dogs do not appear to be reservoirs. In south west Afghanistan the transmitting sandflies have also not yet been investigated; *P. papatasii* and *P. sergenti* which appear to be vectors in Iran, Tajikistan and Iraq [249, 295, 359, 360, 426] also suggest themselves as vectors of the urban cutaneous leishmaniasis in Afghanistan. But above all it must be pointed out that differing determining factors are operative in the distribution of cutaneous leishmaniasis north and south of the great mountain ranges and that the Hindu Kush, as far as results so far published permit the drawing of any conclusions, emerges as an epidemiological frontier between both forms of the oriental sore in Afghanistan.

In modern times DDT applications directed against

Kala-Azar is unknown in Afghanistan. Cutaneous and visceral leishmaniasis are spread in areas which are almost everywhere separated from one another; in the arid highlands cutaneous leishmaniasis is endemic, while Kala-Azar is found chiefly in humid areas of Bengal influenced by the monsoon. Isolated cases have also been observed in Iran and Iraq [197, 315, 334, 425, 444], and there are some small areas known to be foci of infection in the Uzbek and Tajikistan Republics and in Kashmir where both types exist side by side [285, 315, 353, 354, 385]. In the Indian countries *P. argentipes* is held to be the chief vector, in the Transcaucasian areas *P. major* and possibly in some places *P. chinensis* and *P. kandelaki* [353], while *P. papatasii* has only seldom been found in Kala-Azar territory [374]. The possibility of jackals acting as animal reservoirs for *L. donovani* in Tajikistan is discussed by MARUASHVILI [374].

Thus in Afghanistan the epidemiology of the leishmaniases also clearly demonstrates how the distribution of the disease is linked with soil, climate and the natural animal kingdom and Afghanistan emerges in this field as well as part of the geomedical unity of the remaining Iranian-Turanian zone.

3. Typhus

Of the *rickettsial diseases* which occur in the western Asiatic area only the *classical typhus fever* (typhus exanthematicus; *hŏmāye-lākădār*, حمای لکه دار) has so far been observed in Afghanistan. It is an acute infectious disease which is accompanied by high fever and the germ of which, *Rickettsiia prowazeki*, is transmitted from man to man by the bite of infected body lice. Animal reservoirs are as yet unknown. Typhus is a disease of poverty and misery and makes its epidemic appearances at times of heavy louse infestation—as is known from both world wars. *Volhynia fever* (five-day fever, trench fever; *R. quintana)* which is also transmitted by lice, and *murine typhus (R. mooseri)*, transmitted by fleas from rodent reservoirs to man and which has been seen on occasion in ports on the Persian Gulf [188] as well as in India [322, 481], are just as little known in Afghanistan as rickettsial fevers spread by ticks. The question of the occurrence of Q-fever *(R. burneti)* will be discussed in connection with the zoonoses of the country.

a) Distribution in the country. Typhus has been endemic in almost all the countries of the Middle East and hence in Afghanistan as well until the 'fifties and has also occurred epidemically in various parts of the country [211]. In Kabul we encountered it both in pre-war and wartime years [266, 267], although no reports on the frequency of the disease in particular years or on the predilection for certain provinces on the part of the infection which could be turned to account are available. Only BERKE [201] has reported on a serious epidemic outbreak which raged in Aibak near Mazar-i-Sharif in

that in the main they cover only the hospital cases, so that the figures reported, as already stressed on page 94, do not correspond by far with those of the disease which did in point of fact occur. The maps and tables alike are therefore only able to give, on a comparative basis, the approximate degree of infection in the individual provinces of the country and in the case of the more serious outbreaks those which were registered.

To begin with, some of the larger *epidemics* which over the years have been observed in certain provinces are remarkable. In Kandahar a larger outbreak with almost 1,000 cases and high mortality is said to have raged in 1947—48, and in the winter of 1949—50 the town and province were hit once more by a typhus epidemic with a total of more than 1,800 cases; in Kabul, which had numerous cases in practically every winter, a total of 476 cases were reported in the year 1951. In Herat (1953), in Mazar-i-Sharif (1949—50) and in the Parwan Province (1953), epidemic outbreaks have been reported, although they never attained the extent of those epidemics in Kabul and Kandahar already mentioned. In all other provinces the number of cases of typhus is remarkably small. It would seem that larger outbreaks are lacking in so far as it is possible to come to any firm conclusion on the basis of reports.

Surveying the *degree of infection of the country during the report period* from 1948—53, and relating the figures of cases to the number of inhabitants, the same picture emerges. Kandahar with 138.7 cases for every 100,000 inhabitants, is the province most severely infected; Kabul takes second place, whereas in all other provinces the degree of infection remains essentially below the average for the country with 47.9 cases for every 100,000 inhabitants. A comparison of Afghanistan's typhus situation with that of other countries in the Iranian-Turanian area is scarcely possible since the requisite data are lacking; but as far as any opinion is possible on the basis of the few figures available, even prior to the anti-disease measures typhus fever appears to have been scarcely more common in Afghanistan than in the remainder of the Middle East [211].

A direct relationship between the number of infected cases and the *population density* of individual provinces cannot be derived. Kabul Province (33 inhabitants per km²)and Jenoubi (45 inhabitants per km²) may have had comparatively many cases of typhus in every year, but in the most affected province, Kandahar, there are only 7 persons to the square kilometre. Much more likely is the assumption that the concentration of many inhabitants in a small area in the large towns of Kabul, Kandahar and Herat—all of which have recorded several epidemic outbreaks—is responsible for the rate of infection illustrated in *Map No 7*. Typhus is rather more a disease of large towns and especially of old residential quarters, than of the open country with its frequently widely dispersed villages and isolated homesteads.

At times even the *Afghan nomads* have been suspect-

typhus season; the outcome is that transmission of infected lice to the villagers can only occasionally take place. That typhus can spread within a group of nomads, as indeed within any other residence or social community in the country, must be assumed, but it is just these cases that have almost always escaped the statistical record since nomads only rarely attend the hospitals in towns. Nevertheless, it is certainly advisable to include nomads as far as possible wherever any modern prophylactic measures are applied.

b) Seasonal dependency of typhus. Figure 10 (back of *Map No 7)* demonstrates the relationship between the frequency of typhus cases and the seasons over the period 1949 to 1951. Although isolated cases occur at all seasons, great numbers of fever cases always occur in the *cold season*, especially towards the end of the winter when the number of lice among the population and the rickettsial infection of the lice stand at their highest level. This annual course of disease frequency with a peak towards the end of the winter, which is not to be observed in the case of murine fevers, is characteristic of the classical typhus. With the onset of pre-summertime warmth, which naturally encourages people to exchange their restricted homes for outdoor life, to exercise greater cleanliness, to wear lighter clothing and to change their underwear more frequently, the numbers of cases invariably go down; only in very long winters may typhus decline later than is normal, although it always does so with the onset of the warm season. Since animal reservoirs are not to be taken for granted, the few isolated cases, and the late relapses which occur in the course of the summer and autumn in spite of the small number of lice, must be sufficient to retain the infection until the following winter.

It is of course obvious that the typhus fevers of the winter season rage for the main part in the poor quarters of the old areas of the towns which are thickly covered by buildings. Inadequate conditions of hygiene and the communal huddle under the *sandali* (vide page 81) occasioned by the shortage of fuel, leads to the creation of a micro-climate ideal for the development of lice which have always favoured the spread of the disease within the domestic communities in the old quarters of the town. The prosperous part of the population, most of whom enjoy considerably better hygiene conditions in the new suburbs, are naturally far less exposed.

c) The severity of the disease has been judged in various fashions. WHO observers [178] have chiefly seen serious cases with a high mortality rate in Kandahar. At an earlier stage when I myself was in Kabul, I formed the impression that typhus in Afghanistan, as in some parts of southern Russia, takes a relatively light course. Berke [201] who was observing previously unvaccinated patients in Kabul in the 'forties—that is, before the introduction of antibiotics—recorded a mortality rate of only 14.4 per cent, a figure which remains

decisive than the differing virulence of particular parasite strains which is at times suggested. The introduction of antibiotics in the treatment of typhus should have considerably improved the therapeutic success when compared with earlier years.

d) The fight against typhus met up which great difficulties both in pre-war and wartime periods. The conditions of hygiene in the old homes could scarcely be altered and for reasons of family traditions the isolation of patients proved to be impossible in most cases; moreover, insecticides for the extermination of lice were not yet available. Thus prophylactic vaccination, the effec' of which was undisputed but the application of which was always restricted to relatively small groups of the population, presented practically means of controlling typhus at that time. In the winter of 1949/50, DDT was used in large quantities for the first time in Kandahar.

In 1951, the WHO and UNICEF, together with the Afghan Ministry of Health, took up the planned campaign against the fever, beginning their work in the worst-affected provinces of Kabul and Kandahar. In the period ending in the middle of March, 1952, a total of 312,832 persons were treated with 10 per cent DDT in both of these provinces and another 70,000 people in other areas at risk. The action which had necessarily to impinge on the private sphere of the communities, presented something completely novel for town and country, but was soon received with interest by the population and particularly so because there were numerous female members among the 172 helpers in the teams who could deal with the treatment of women and girls. Costs were low: they amounted to about 0.60 Afghani (0.024$) per person. Only those persons who had been in direct contact with sick people, and thus with infected lice, were vaccinated [36, 178, 386].

The *results* of the campaign were remarkable: Fig. 9 and a comparison of *Map No 8* with *No 7* show that already one to two years after the start of the campaign the number of typhus fever cases reported had receded abruptly. Great epidemics such as had occurred in Kabul and Kandahar kept away, and apart from one small outbreak in Parwan Province in 1960, only isolated cases were registered after 1954. Even if numerous cases were not noticed and did not appear in the reports in the following years, it must be assumed that the danger of great outbreaks of typhus had already been overcome in 1953 and that single cases and infections of small groups which occurred at later dates did not in any way epidemiologically approach the importance every individual case had to attract in earlier times.

This does not mean that there will not be any typhus in Afghanistan in the future! The possibility of outbreaks of typhus in towns and villages from time to time in the winter months, especially in the old residential quarters, must be faced squarely. But the success of the measures taken so far has shown that it is possible to intelligent cooperation with WHO and UNICEF, has solved one of its many serious public health problems. If a careful supervisory service is conducted in the various provinces of the country in the coming years, which is bound to become more effective as the number of Afghan doctors increases gradually, hope seems to be well founded that the success achieved so far will prove lasting.

4. Relapsing Fever

The relapsing fevers *(Febris recurrens; hŏmāye-rājeăh,* حمای راجعه) constitute a group of acute infectious diseases which are marked by repeated fever relapses which last for several days and are caused by different species of *Borrelia* (described in earlier times as "blood spirochaeta"). Body lice or ticks are the vectors, so that the *louse-borne relapsing fevers,* which occur seasonally and for the most part *epidemically,* must be distinguished from the *tick-borne relapsing fevers* which are *endemic* and occur throughout the year, albeit as a rule in isolated cases only.

a) Distribution in the country. The occurrence of relapsing fevers in the entire Middle East, and particularly in the Iranian-Turanian area, had already been repeatedly described in the pre-war years. The infections were, however, by no means described uniformly. While Willcox [539] and Bodman and Stewart [209] chiefly observed mass occurrences of the louse-borne fevers, other authors [182, 288, 302, 327, 328, 375, 440] had already pointed out at an early stage that the relapsing fevers of the Iranian-Turanian countries, including the Soviet Central Asian Republics, are predominantly transmitted as endemic fevers by ticks.

It is extraordinarily difficult to gain a clear picture of the real distribution and frequency of relapsing fevers in Afghanistan. Statistical data seem to be so incomplete as to permit scarcely any reliable conclusions, and the number of publications which deal specifically with Afghan relapsing fevers is minimal. The reports of the WHO [513] published during the 'fifties show, however, that relapsing fevers still occurred at that time in most of the provinces of the country. Two larger epidemics are said to have struck Kabul Province in 1950 and 1951; the provinces of Kandahar, Jenoubi (Gardez), Ghazni and Parwan too, as well as Mazar-i-Sharif and Badakhshan in the north of the country are mentioned, while no cases are reported from what was then the Herat Province. Table IX gives a synopsis of all figures published in WHO reports. Assuming a population total of about 12 million for the period 1948—51, an annual rate of infection of 0.8 to 1.1 cases per 100,000 inhabitants is arrived at. Since there are only a few single cases during the following years the country would appear to have been already free of relapsing fever since the mid-1950's. Nevertheless, it is the very epidemiology of relapsing fevers in the arid

that at least some of the cases might be *endemic* recurrens infections, *transmitted by ticks*, which, due to the biological particularities of their vectors, occur throughout the year and mostly as single cases.

But on the other hand in the period 1949—51, there is a striking increase in infected cases *in the spring months* with a sudden increase in March and a peak of the graph in April. The assumption which suggests itself is that this seasonal peak was caused by *epidemic outbreaks of louse-borne relapsing fevers*, which, similar to typhus, occur towards the end of winter at the time when the louse population is most highly infected. Obviously such conclusions are only of conditional utility considering the small number of reported cases; nevertheless, while assuming a requisite critical viewpoint, the assumption may be made from the epidemiological analysis and the comparisons with neighbouring countries, that in Afghanistan the *endemic tick-borne as well epidemic relapsing fever spread by lice have existed side by side* until modern times [266, 268].

An unequivocal clarification of the question is possible only through an investigation of the agent-vector relationship, i. e. the borrelia and their development in lice and ticks. Since such investigations have been carried out in Iran and the Soviet Central Asian Republics, but not in Afghanistan, the epidemiological analysis of Afghan relapsing fever must, in decisive points, rest on results gained in neighbouring territories.

Of the numerous species of *Ornithodorus* found in the Middle East including the Soviet Central Asian Republics—to mention only *O. crossi*, *O. erraticus*, *O. lahorensis*, *O. papillipes*, *O. tholozani* and *O. verrucosus* [239, 403, 405, 440] at this juncture—*O. tholozani* is now considered to be the most decisive and probably virtually the only transmitter of *B. persica* to man [191, 239, 403, 437, 455, 499], while *O. verrucosus* only appears to transmit human infections in Caucasian and Transcaucasian areas [372, 470]. The decisive factor, however, is that *O. tholozani* occurs in the surroundings of Kabul—a fact established some years ago—and Baltazard, Bahmayan and Chamsa [191], on the basis of their own observations, think it highly probable that even in Afghanistan endemic relapsing fever is caused by *B. persica* and transmitted by *O. tholozani*, i. e. that it is subject to the same epidemiological laws as the tick fevers of geographically and climatologically similar areas.

That *louse-borne relapsing fevers*, too, occur in the country at the same time must be accepted as proved on the basis of epidemiological observations. The 100 cases among prisoners in Kabul described by Sénécal and Ahmed [461] were clearly cases of louse-borne fever and from medical experience I too know cases of the "European" relapsing fever well (i. e. louse-borne relapsing fever), which occur late in winter and in the spring and at times expand into small family epidemics.

The question whether an epidemiological and possibly significant "cross-wise" transmission of tick borrelia mally transmitted by ticks, could be used to infect lice [187, 189]. The possibility of the development of epidemic outbreaks of recurrent fever from endemic foci by a "change of vector" is thus eliminated as an epidemic factor, and in accordance with epidemiological theories the results of the studies mentioned above speak for the fact that even in most recent times *two different relapsing fevers existed side by side* in the Middle East, and therefore probably in Afghanistan as well, as had already been suggested in earlier works [268].

The question of the importance of *animal reservoirs* has not been followed up in Afghanistan, although it has been pursued in the neighbouring countries. In the Transcaucasian areas *O. lahorensis* is considered to be a carrier only within the rodent population (Gerbillidae and Muridae div. spec.), but not a vector to man [406, 493]. In the Soviet part of Turkestan, however, the anthropophilic species *O. tholozani* has sometimes been found infected in rodent burrows [405, 470, 493], so that here the endemic fever is possibly primarily a zoonosis which can be transmitted to man under favourable conditions. But since ticks remain capable of infecting man for many years and are even able to pass on the infection transovarially to the next generation, it is debatable whether there is any necessity for animal reservoirs in the preservation of the infection. Investigations in this very area of the Middle East have left many open questions and not succeeded in providing conclusive answers. It has also not yet been proved whether the same inter-relationships exist in Afghanistan as in Iran and the areas north of the Amu Darya or not, although this is probable. As far as louse-borne fevers are concerned, the existence of animal reservoirs has been denied by the majority of investigators.

c) Control of the fevers. In recent years the numbers of cases of relapsing fever have markedly receded in Afghanistan as well as in Iran, and no cases have been reported in the 'sixties. That the epidemic fevers transmitted by lice have practically disappeared in the course of the DDT campaigns against typhus fever comes as no surprise. But the tick populations too, may well have been reduced by repeated DDT applications—directed especially against malaria vectors—at least in so far as they were lodgers in domestic quarters. As a result tick—borne fevers have also become rarer. In any case this holds true for the residential areas of the towns where the improvement of sanitary conditions in old parts and the erection of new buildings have also led to decisive results in the battle against relapsing fever. In the countryside, in villages and isolated homesteads, the construction of which offers conditions of life especially favourable to ticks in spite of the DDT campaign, recurrent fevers probably still occur—although less frequently than heretofore and in most cases not recorded statistically—and when the epidemic louse-borne fever is practically extinguished, the endemic relapsing fever

that such reports are equally true of Afghanistan. But since relapsing fever appears to occur only sporadically nowadays, no longer presenting a great public health problem, the nomads, too, can no longer be considered as significant epidemiological factors, especially since they have also long since been included in the prophylactic measures.

5. Virus Diseases

In the hot lands of the Old as well as New World some virus diseases are transmitted by insects, and some of these are endemic whilst others have led to serious epidemics. *Pappataci fever (sandfly fever)* is a benign disease with a fever that often lasts for only three days but is followed by a rather protracted period of convalescence. It is transmitted by Phlebotomus flies (see page 102 also), and as a rule it leaves behind an immunity of but short duration. *Dengue fever* (dandy fever) which is spread by *Aëdes aegypti* and some other species of *Aëdes*, lasts for about seven days, pursues a fever course with two characteristic fever peaks, manifests itself with skin rashes and so-called dengue rheumatoids, is also prognostically favourable and in the main leaves behind an immunity which persists for several years. Great epidemics of dengue have been observed in the subtropical parts of America as well as in the Old World, particularly in India, the Mediterranean countries and Australia. The most dangerous of these virus infections, *yellow fever*, is a disease of African and American tropical countries, but is unknown in the entire Asian sphere and thus too in Afghanistan.

a) Pappataci fever was, until modern times, widely spread [266, 267] in Afghanistan in a manner similar to that of the neighbouring territories of Iran and Turkestan. Contrary to the assumption of earlier writers that the fever did not occur at altitudes above 600 metres, we saw numerous cases in Kabul (1,803 m.) every year after the start of the Phlebotomus season. Due to the lack of suitable laboratory equipment it was not possible to establish their existence virologically, but without doubt they impressed us as being pappataci fever from the clinical and epidemiological angle. However, larger epidemic outbreaks, as recorded in the lower lying areas of the Middle East region and the Soviet Central Asian Republics, have not been observed in the highlands. But in principle the entire inhabited area of Afghanistan up to a height of about 1,800 metres might well be infected; in areas above this altitude no cases of pappataci fever have been reported.

The *epidemiological* qualities of pappataci fever have not so far been investigated in Afghanistan, with the result that only the findings of research carried out in neighbouring countries can be used as a basis for assessment. In the endemic areas beyond the Amu Darya mainly *P. papatasii*, which is also known as a vector of cutaneous leishmaniasis (vide page 103) has been found to occur only at altitudes up to 600 metres or 900 metres [373, 423], the question must be considered whether other species transmit the virus at higher altitudes. In the mountainous endemic areas of the Kirgiz, north of Afghanistan, where *P. papatasii* was absent, *P. caucasicus* proved to be distinctly anthropophilic [404]; but whether this species acts as a vector and whether it occurs at all in Afghanistan also remains unknown so far.

The *seasonal fluctuations* of the frequency of the fever follow the main development phases of the adult sandflies.Thus Petrov and Viskovsky for example, noted a two-peaked annual graph in Tashkent (480 m.) with one peak in spring soon after the appearance of the first generation of vectors, followed by a passing decline in infected cases from the end of June until the beginning of August, and then a second peak in the months August to September; a course similar to the one observed earlier in the coastal regions of the Black Sea [538]. In the higher-lying areas, however, the fever seems to occur in the summer months only [227], and according to our own observations the disease occurs earlier and more frequently in the warmer areas of Afghanistan than in the Kabul highland, where—again dependent on the sandfly season—we saw it from the end of May until well into summer, but not in late summer or autumn.

In a manner similar to that of the inhabitants of Turkestan [404] the native Afghan population also seems to develop an early *immunity to infection* by repeated infections during childhood, with the result that we scarcely ever saw clinically-speaking fully developed aspects of the disease among adults. Non-immune foreigners, however, often fell ill, even during their first year in the country; this has also been reported by Pavlovsky [404]. On several occasions *re-infections* were observed, but it is not clear whether they represent the result of an incomplete immunity [233] or are fresh infections with other virus strains.

The question of the *hibernation* of the virus and the revival of the disease in the following spring has also as yet not been cleared up; in any case it is not certain whether a transmission of the agent to the progeny of the sandflies, hibernating only during the larval stage and not as adults, really takes place [390, 404, 452].

Before the introduction of insecticides the control of the disease was difficult and not very promising since sandflies easily penetrate mosquito nets with meshes of over 1.5 mm. Besides this the majority of the population cannot afford to buy these protective nets. In the course of the anti-malaria campaign using DDT, the *Phlebotomus* populations were also reduced in large measure, with the result that pappataci fever occurs much more rarely than before and has even completely died out in some places, especially those areas affected by the malaria protection measures. This seems to be similar to the

Assuming that the genuine dengue fever is confined to areas with an annual isotherm of at least 14° C. [242], the fever, if it were endemic in Afghanistan at all, could occur only in the lower lying areas of the country—where in fact it has as yet never been noted.

It is equally unknown whether there are any suitable *vectors* in Afghanistan; in any case, neither *Aëdes aegypti* nor *A. albipictus* or *A. scutellaris* have been found to exist in Afghanistan. *A. aegypti* is found chiefly in the coastal area of the Persian Gulf [251], in Iraq [394] and in north western Iran, but recently also in West Pakistan in the region of Kohat-Hangu, Lahore and Peshawar [172, 226, 246, 432], that is on the southern slopes of the Afghan-Pakistani border mountains, and it has been suspected by some authors that over the course of years *A. aegypti* has migrated inland from the basin of the river Indus [246, 305, 432] and has now become a vector of the dengue fever in West Pakistan. But in Afghanistan and in the areas north of the Amu Darya this species has never yet been observed [267, 276].

A. albipictus prefers damp breeding areas with an annual precipitation of at least 1,000 mm. [246, 503], but it has recently occurred in West Pakistan even at altitudes of 1,700 metres [172, 432], while *A. scutellaris* is unknown in almost all countries adjacent to Afghanistan. The remaining species found on the Iranian Plateau:—*A. caspicus, A. pulchritarsis, A. geniculatus* and *A. vexans,* which might conceivably be expected in Afghanistan are not considered to be vectors. Thus the conditions for the spread of dengue fever in Afghanistan do not appear to be present, at least in so far as the problem of transmission is concerned, even if the subtropical regions of the Eastern Province are well within a climatic zone suited to the settlement of *A. aegypti.*

It was far more surprising to see dengue-like fevers, isolated cases and group infections alike, occurring quite often in Sarobi as well as in Kabul. But even then neither we nor the entomologists engaged in the country found Aëdes mosquitoes; with virological investigations impossible, the cases could not be explained etiologically. It might be conceivable that other types of viruses related to the dengue virus and transmitted by culicine mosquitoes have been the cause of these diseases. In any case it appears desirable in regard to the extent of the areas of distribution of *A. aegypti* and *A. albipictus* on the southern slopes of the Afghan-Pakistani border mountains, that entomological research is being carried out not only on anopheline but also on the epidemiologically distinctive culicine mosquitoes.

Thus the epidemiology of virus diseases transmitted by insects also demonstrates the close connection between the Afghan area and the remaining Iranian-Turanian countries.

an acute infectious illness which, accompanied by vomiting, very loose discharge, extremely high loss of body fluid and disturbances of the circulation, leads to death in a high percentage of cases despite modern treatment. The source of the distribution of the disease is mainly infected persons who contaminate the drinking water by the passing out of vibrios; healthy carriers, however, play but a minor role. In its home areas cholera reigns endemically; but during the last 150 years it has repeatedly covered all the continents save Australia with great pandemics [448, 449, 450, 486].

The home of *endemic cholera* is India and East Pakistan where the disease is known in the area of the great river flats as well as at the mouths of the Ganges and Brahmaputra, together with the Godavari River, since antiquity as a *nesting disease* [206, 419, 420, 490]. Thus it is linked with humid lowlands; at altitudes above 75 metres in East Pakistan and 150 metres in India there is no more endemic cholera [206, 489].

The slow moving and infected rivers of the lowland and the stagnant waters of ditches, wells and pools, which, due to the processes of decomposition, show pH values favourable to the development of vibrios, are considered as the *disease foci.* Cholera vibrios have been proved in the rivers and wells of the endemic areas at almost all seasons [158, 208, 229, 238, 323, 489].

Seasonal fluctations in frequency are also known in the case of endemic cholera; it generally occurs to an increasing degree in the hot season. The monsoon rains can sweep infected faeces into the water containers; infected pools, on the other hand, may be flooded and thus cleaned by the rains, so that evidently local circumstances, which are decisive for the preservation of the endemicity, can rather vary from one area to the next. A coincidence of great humidity with high temperatures and intermittent rains at the time of a high groundwater level, seems to create the best conditions for preservation or spread of the disease [229, 323, 458, 489].

Epidemic outbreaks within the endemic area, which are in part caused by the contamination of water, a by-product of large scale pilgrim festivals, have been observed in India as well as in East Pakistan [195, 488], and even in Calcutta, where endemic cholera had receded remarkably after the filtration of water had been introduced, epidemic outbreaks occurred repeatedly in most recent times as a result of the pollution of water [159, 208, 229, 238, 323, 451, 458].

In addition cholera has repeatedly broken out of its purely endemic areas and has affected adjacent countries and those further afield as a *migrating disease,* sometimes persisting there for several years—a process, the causes of which and the laws governing it, has been as yet inadequately clarified [166, 318, 319, 458]. It is true that cholera has been known for a long time mainly to follow the traffic routes, but why the disease is

b) Cholera movements in Afghanistan. It may be assumed as a matter of certainty that the great pandemics of the 19th Century also reached Afghanistan [288, 300, 419, 450, 486]; in the second half of the last century, at least, the disease had appeared in the country on several occasions [42]. The last pandemic, which lasted from 1899 to 1923, probably reached Afghanistan as well as Iran.

The migrations of the disease which took place in more recent times, that is after 1930, can already be followed up much more clearly than the earlier ones and are shown in *Map No 9*. In *July, 1930*, cholera migrated from the North West Frontier Province, which had been strongly infected on that occasion, along the Khaiber Road to Jalalabad, Kabul and Charikar. From there it moved through the Logar Valley, along the great communications route to Ghazni where 160 new cases were reported within two days, then, again following the caravan and road route, moved via Mukur to the Kandahar area where it gradually came to a close late in August. The total number of infections and deaths has not been recorded. Trade caravans or individual travellers who were "contacts" were probably responsible for spreading it along the traffic routes. It could not have been done by nomads since they do not, practically speaking, travel along the road in the south westerly direction during mid-summer.

An unimportant outbreak occurred in Zurmat (Southern Province) in *October 1936*, a fact which deserves attention, because cholera broke out in the North West Frontier Province as well some four weeks later, and the possibility of its having been spread by nomads who were migrating southward in the autumn cannot be excluded [220, 517].

Much more serious, however, was the *cholera epidemic in 1938*, which had already started in Peshawar late in April; it moved through the Logar valley with a caravan of nomads and reached Kabul in May, from whence, once more taking the traffic route, it moved to Kandahar and, by way of Seistan, further afield to Khorassan. Today it is no longer possible to trace how far it penetrated to the west and north west into Herat Province or even into Iranian Khorassan.

In Kabul, immediately after the first case has been notified, we established a protective service and attempted to counter the disease by treating the sick, chlorinating the water reservoir and shaft latrines in the old part of the town, halting the importation of fresh fruit from the cholera areas of the Southern Province, diverting the nomads' route around the city and by vaccinating as many people as possible with a vaccine produced in Kabul itself (vide page 92). Although we did not succeed in preventing scattered cases of contagion, we were able to avoid an epidemic spread of the disease in the city, the old parts of which furnished the best possible conditions for its spread. It is true that the dry climate and the permeability of the alluvial loess-soil may have but it was only from January, 1939, that the country was really free from cholera. The total of cases reported amounted to 3,855 with a mortality of 55.5 per cent (2,141 deaths); this was a not altogether surprising result in view of the still inadequate medical service in the rural areas proper [220, 515, 516, 517].

This epidemic is remarkable because it happened, comparatively speaking, early in the year, i. e. immediately after the rainy season (vide Fig. 12; back of *Map No 9)*, and continued throughout the year. It demonstrated the importance of the nomad movement in the spreading of cholera from one country to another and at the same time taught us that in a town, when soil and climate are unfavourable to disease, the prevention of great epidemical outbreaks can be successfully undertaken with comparatively simple measures, even when hygiene conditions are unsatisfactory, so long as the infection of the numerous wells in the old part of the town and of the central water reservoirs is avoided.

In June, 1939, a few months after the abatement of the epidemic of the previous year, cases of cholera cropped up once more in the Girishk area—a fact which can obviously not be linked with any importation from areas situated beyond the border mountains, since the adjacent Baluchistan was perfectly free of cholera, but rather with a recrudescence of the disease from the previous year after it had hibernated. The first cases occurred on June 25th, and within a few weeks the disease, following roads, caravan routes and the course of the Helmand River, spread in a fan-like fashion in different directions, and in the course of the summer it penetrated as far as Kandahar and the Herat Province. Whether the city of Herat itself and the Iranian part of Khorassan were affected is not longer apparent. Details of this dispersion of cholera, as far as they can be traced from available reports, are also given in *Map No 9* [220, 517].

Based on the experiences from the previous years, measures to fight it were quickly introduced. Apart from the treatment of patients, they consisted above all of protective vaccinations in affected and endangered settlements, as well as in the closure of the epidemic areas. From the end of October no more fresh cases were reported, and on December 8th, 1939, the country was declared free of cholera. The total of cases reported amounted to 1,444 with a mortality of 57.8 per cent (835 deaths). Bacteriological investigations on the type of germs involved are not available in the literature.

This epidemic also occurred in the dry season (Fig. 12; back of *Map No 9)*. Since no importation from neighbouring areas is discernible it must be viewed from the epidemiological angle—that is as an offshoot of the disease which had already been on the move since the previous year from its endemic areas towards the north west and thus into the Iranian-Turanian area [318, 319].

A few unimportant and locally restricted outbreaks

May. In the middle of August it advanced from Quetta to Kandahar, where 268 cases (61 deaths) were reported over the period August to November. Independently of this, the disease moved from Peshawar to Jalalabad in September and spread in the Eastern Province where 395 cases (56 deaths) were notified. It was carried to Kabul by a single traveller who was already infected but only showed symptoms at a later stage, but thanks to control measures which were introduced immediately only 20 cases (7 deaths) were reported.

In October the disease spread to Kataghan Province as well and 206 cases (75 deaths) were recorded, 65 of which occurred in the town of Baghlan. It remains doubtful whether migrating nomads were really responsible for the northward dissemination, as has been assumed by Soviet authors [415], because the Afghan nomad route does not lead to the north in October, it seems far more probable that trade caravans or other travellers are to be considered as the spreaders. In November the epidemic died down and by the end of the month the country was once more free of cholera. The total number of cases was given as 889 (199 deaths).

Concerning the action taken against this outbreak, a group of Soviet experts was engaged by the Afghan government and it carried out an extensive programme of protective vaccination in endangered and affected places, together with the application of bacteriophages as well as a thorough treatment of all patients also supported by bacteriophages [415]. In spite of the inadequacy of the hospital beds available, the results were surprisingly good. The treatment with bacteriophages is said to have proved itself, and for the first time mortality was lowered to 22.4 per cent. Considering the inadequacy of the accommodation and provision for many patients, this outcome was remarkable.

Epidemiologically it is a remarkable fact that the disease had once again moved along the traffic routes; it has also become evident that the slow-flowing irrigation channels in the north of the country are suited to the spread of cholera once they are affected by vibrios [520]. Bacteriologically speaking, classical cholera vibrios (Ogawa strain) have been identified [415, 515, 517].

A final cholera intrusion into the Middle East area was observed in *1965*. The epidemic began in the village of Arabkhana near Andkhoi, where the first cases of diarrhoeal illness already occurred in May. From here the disease spread to the south west as far as Herat, and eastwards across the entire northern area of the country as far as Khanabad and Taluqan. It did not, however, move south, so that the area of the Southern and Eastern Provinces, which had so often been infected in earlier times, were spared on this occasion.

The isolated infection of the northern provinces was bound to arouse suspicion that on this occasion the disease had not been imported from the south eastern border countries as had so often happened on previous

In the case of this epidemic, control measures were carried out by Afghan doctors, supported by a Soviet group of bacteriologists. Patients, who could be isolated in towns but not in villages, were treated with chloramphenicol, large intravenous infusions and bacteriophages [386]; in addition, quarantine stations were set up on the provincial boundaries with the aim of supervising, and at times carrying out, protective vaccinations. In the infected and endangered areas a total of 111,000 persons were vaccinated. Water for drinking and domestic purposes was disinfected as far as this was practicable.

With the onset of autumn the number of infections decreased; from October 3rd, Afghanistan was once more free of cholera. The total number of reported cases reached 1,564 with a mortality rate of 20.8 per cent (325 deaths). Bacteriologically, *classical cholera vibrios* as well as—for the first time in Afghanistan—*El Tor strains* were identified, a fact which justifies the assumption of a possible connection with the El Tor cholera raging in South East Asia in the same year.

In addition the last outbreak of cholera in Afghanistan must be seen as part of a larger epidemic in the Middle East. Already in July the first cases were reported from the *Iranian eastern provinces*, leading to an extensive epidemic which persisted until the end of November (2,943 cases notified). Whether the disease was introduced from Afghanistan by the border traffic has not yet been elucidated, but it must be considered to be a possibility. In the same year the *Soviet Union* too, reported altogether 570 cases of cholera (23 deaths) in the Kara Kalpak Republic and in the Khorezm area (Uzbekistan) over the period from August 21st to September 13th, amongst which *Ogawa* strains were bacteriologically identified. In these cases, too, the possibility of importation by border traffic from Afghanistan, that is ferries across the Amu Darya, cannot be excluded. In any case the Soviet authorities temporarily suspended entries from Afghanistan then as part of their measures against the disease [160, 386, 517].

c) Epidemiological explanation of cholera occurrences in Afghanistan. From these reports on cholera outbreaks during the last decades it may be seen that the entire Iranian-Turanian area is a *non-endemic cholera region*. The arid highland, strong radiation, permeability of the soil in alluvial settlement areas and the fast-flowing highland rivers create conditions which make the development of endemic cholera difficult or even prevent it. *Epidemic* outbreaks, however, have occurred from time to time, but they have always died down again after a few months and only once (1938/9) did the disease revive in the following year after hibernation.

It becomes apparent, moreover, that the cholera outbreaks recorded in Afghanistan must not be regarded as isolated events within the country. Similar to the

1938 in Afghanistan—the disease was spread by caravans. Later, just as had happened previously in 1930, it followed to the great road to the south west of the country, be it with trade caravans, nomads or single travellers. In recent times it moved with modern transport media, in the main with cars (e. g. in 1960), still using the same roads, but moving much more speedily than before. It may cover even greater distances in a minimum of time by travelling by air (possibly in 1965), thus making the movement of the disease more erratic and also harder to trace than was the case before. In north Afghanistan in 1960, Soviet experts showed how slow-moving *infected watercourses* can spread the disease in Afghanistan, although it lies outside the endemic area [415]; the fast-flowing and modern irrigation channels in the newly-opened agricultural areas in the south of the country are, on the other hand, most probably not a hazard in view of the spread of the disease.

In Afghanistan, as in neighbouring arid countries, cholera is a *disease of the hot dry summer season.* Figure 12 shows that all the cholera outbreaks recorded since 1930 began at the end of the rainy season and persisted throughout the summer, dying down again with the onset of the cool season. The epidemics are seasonally conditioned and manifest themselves at the times of water shortage when the infection of individual pools and wells is more serious, and not during the winter months which enjoy ample precipitation. *Thus the epidemiological qualities of the disease are essentially different from those in the Indian endemic areas.*

Finally, the presentation demonstrates that even in modern times, attempts to extinguish the epidemics succeed in the main only after the passage of several months. The sanitary conditions in rural areas and in the old residential quarters of the towns, as well as the use of surface water from irrigation channels, still present factors which make the fight against the disease difficult. Old-fashioned habits of the conduct of life within families make the isolation of patients difficult and the number of hospital beds is often insufficient in the case of epidemics. Even if everything possible is done by the health authorities, early interruption of the natural course the disease appears to be difficult.

The *success of treatment,* however, has improved remarkably in recent times. The reduction of deaths from 57.8 per cent to 22.4 or even 20.8 per cent in the last outbreaks, represents progress attributable not only to foreign assistance but also to the accomplishments of the young Afghan medical profession which had already managed to play a decisive part independently in the fight against cholera in 1965.

No one can predict whether cholera will again break out of its endemic areas in years to come and whether it will infect the Iranian-Turanian area once more. But in any event, the necessary quarantine measures in case of unexpected epidemic outbreaks should be prepared well in advance, so that at the moment of danger a

of the paratyphoid group), are taken in with infected foodstuffs, particularly milk, fruit and lettuce, and also with drinking water. Convalescent persons and healthy carriers of the infection play a prominent role in the spreading of the disease (food sellers and kitchen personnel particularly so). The manuring of the gardens with fresh faeces also can lead to contamination of lettuce and raw vegetables, while flies, although present in abundance in the East, have no significant influence in the spreading of typhoid infections.

a) Distribution in the country and frequency. In Kabul we at all times saw comparatively numerous typhoid and paratyphoid infections, and in other parts of the country too, they were always present. Unsatisfactory sanitary conditions in the old residential quarters, insufficient water supplies by water carriers in the town centre, manifold contaminations of fruit and lettuce in the bazaars by water taken from open ditches, as well as milk products which are brought into town from the villages all provide many possibilities for infection.

It is difficult, however, to gain a clear picture of the *distribution* and *frequency* of the disease. Table VIII shows the number of typhoid and para-typhoid cases statistically recorded in the period 1948 to 1966. The figures are remarkably low and it is to be assumed that this list contains only those cases which were treated in hospitals—and all of these may not have been entered—and that the true figure of infections is much higher. Nevertheless, I feel justified in concluding from this table that Afghanistan is less strongly infected than some of its neighbours, probably as a result of its geophysical and climatic peculiarities. Iran and Iraq, for example, both reported several thousand cases every year—that is, several times the total of cases registered in Afghanistan.

Furthermore, the table shows that typhoid infections were more numerous in 1948, 1950, 1953 and 1954 than in the other years. This was also the case in adjacent countries and it is known that in most countries of the Near and Middle East, typhoid infections increased markedly at the beginning of the 1950's, a fact obviously resulting from the fast increase of traffic from town to town and from country to country in the post-war years [502].

Apart from this, the number of infections remained fairly constant over the years. It must be remembered, however, that, due to the development in hospital care and medical treatment as well as to improved bacteriological diagnosis, a higher percentage than before of all cases occurring is now recognized and appears in the reports and that the total of infections had probably decreased, even if this has not yet been made plain in the statistics.

b) Seasonal fluctuations cannot be indubitably recognized from the few reports available [513]. From a purely empirical point of view, we used to have the

tably short period covered by the report and the small number of cases, no definite relationship of seasonal dependency is to be recognized. Isolated local outbreaks apparently determine the course of the annual graphs more than seasonal fluctuations. No clues on the selective infection of certain provinces, especially in relation to population density, are to be found in the report under consideration.

c) The clinical course taken by the disease by no means always corresponded to the classical form of the disease, as has also been observed with earlier epidemics in central and nearer Asia [292]. As a rule the disease took a relatively mild course among the indigenous population and, even before the introduction of antibiotics, intermittent fevers of short duration, without any development of continua, were often observed. In spite of often wholly inadequate sanitary conditions, contact infections within a residential community were relatively rare, so that a certain immunity to infection possibly exists among the native population. With foreigners, however, serious and persistent manifestations of the disease were at times observed. No data on the death rate among natives and foreigners are available.

Bacteriologically speaking Salmonella typhi predominates. Table VIII shows that in the period from 1952 to 1964, out of a total of 7,441 infections there were 7,003 cases of typhoid fever but only 438, that is 5.9 per cent, cases of paratyphoid fever. In the paratyphus group, paratyphus B appears to occur most frequently, while the types A and C are rare. As sporadic cases only, I recall typhoid-like disease manifestations with which *Bact. alcaligenes faecalis* were identified.

The introduction of antibiotics made the treatment of typhoid infections significantly more effective and safer than before. It can be assumed that with further improvement in therapy but, above all, with further developments in sanitary installations and marked supervision, a gradual decrease of typhoid and para-typhoid infections will take place. For the time being foreigners living in the country would be well advised to take advantage of reliable prophylactic vaccination.

3. Dysentery and Dysentery-like Infections

Particularly during the summer months, genuine dysentery and dysentery-like infections *(peetsch,* پیچش) are extremely frequent in Afghanistan as in almost all countries of the Near and Middle East. They are amoebic infections as well as bacterial dysentery and so-called "unspecific" bacterial catarrhs of the large intestine.

a) Amoebic infections. Of the numerous kinds of amoebae living in the intestines of man, only *Entamoeba histolytica* is pathogenic; it occurs in most countries of the world, but more frequently in the hot zones than

ment of clinically manifest amoebic colitis by the addition of secondary bacterial infections of the intestines.

There are no satisfactory data on the *frequency of amoebic infections* in Afghanistan. The degree of infestation probably corresponds with that of adjacent countries of the Iranian-Turanian area. During the 'forties for example, about 12.7 per cent of the population in Tashkent was infected by *Entamoeba histolytica* [356], other areas of Turkestan reached a level of up to 40 per cent [257], and in northern India (Amritsar) there were 13.6 and 29.8 per cent respectively who were infected among the groups selected for examination. Evidently the entire Iranian-Turanian area as well as India are strongly infected by amoebae. Most of these are *latent infections* without clinical symptoms, and certainly in Afghanistan, too, the great majority of all amoebae infections remain latent for a long time.

The *clinically manifest amoebic colitis* which represents about 3.8 per cent of all dysentery cases observed in southern Iran [483], to quote an example, is also rare in Afghanistan, at least at the higher altitudes [386]. This assumption is supported not only by experience gained in Kabul, but also by observations made on people returning from Afghanistan in whom amoebae were found frequently, but colitic symptons only very occasionally. The clinically manifest amoebic dysentery probably occurs much more often in the lower lying, hot provinces of the country than in the highlands, as is known from other countries as well.

Table X gives a synopsis of all cases of amoebic dysentery reported in the years 1952—64. Since only a fraction of all cases which really occur undergo medical treatment, it must be assumed that the real figure amounts to a multiple of the given data. As in other countries [580], the frequency of amoebic dysentery in Afghanistan too, seems to have decreased in the course of the last ten years.

The *clinical reports* show all stages from very slight catarrhal to the most serious ulcerous forms; but regrettably enough, diarrhoeal cases are not always considered severe enough, so that planned treatment is often not possible. Liver complications (amoebic hepatitis and liver abcesses) have been observed on occasion.

No observations on the frequency of infections with *apathogenic amoebae* such as *Entamoeba coli, Dientamoeba fragilis* or *Endolimax nana* are available.

b) Bacterial dysentery. Much more frequent, however, than amoebic colitis is the bacterial dysentery, and this fact, too, corresponds with the conditions in the adjacent countries, and particularly with the observations made in southern Iran where 37.3 per cent of all dysentery cases examined were proved to be bacterial infections [483, 520]. The cases reported in Afghanistan in the period 1952—64 are represented in Table X; since diarrhoeal diseases are everyday affairs and by no means always a cause for medical treatment, the figures cannot

high, was largely conditioned by bacterial dysentery infections just as in Iran and Turkestan [266, 338, 386, 417].

Bacteriologically infections of the type Shiga, as well as Flexner were observed; but as in the neighbouring West Pakistan [349], dysentery of the type Sonne appeared to be frequent and occasionally led to highly febrile and gravely toxic conditions. We seldom saw even *paratyphoid infections* (especially type A) pass under the clinical picture of a genuine dysentery [266, 386], a fact which has already been noted in other countries of the Middle East—e. g. Mesopotamia—several years ago [347].

Today, in the age of sulfonamides and antibiotics, the treatment of bacterial dysentery infections is by no means as serious a problem any longer as it was in the earlier days of post-war and wartime years.

c) Unspecific intestinal catarrhs. Throughout the country, as in adjacent countries, the so-called "unspecific" bacterial catarrhs of the intestines occur unusually frequently among natives as well as among foreigners. STEWART [483] found up to 56.5 per cent of all "dysentery" patients examined by him in southern Iran to be suffering from such unspecific infections, and the proportions may well be similar in Afghanistan. A large number of these may possibly be slight dysentery infections, some possibly even infections with atypical coli bacteria [157]. Persons having an insufficient hydrochloric acid production in their stomachs fall ill more frequently than those with healthy stomachs.

d) Nothing is known in Afghanistan about *Balantidial dysentery (Balantidium coli;* Ciliata, Protozoa). It appears to be rare in most countries of the Middle East as in the Soviet Central Asian Republics [277, 379, 400]. Even if occurring at times, it scarcely plays any role in Afghanistan. *Lambliasis (Lamblia intestinalis* or *Giardia lamblia;* Flagellata, Protozoa) is possibly more common in the Iranian-Turanian area as indeed in other hot countries too, than in Europe; but on the occasion of an examination in Kabul schools, it was found in no more than 1.3 per cent of all stool samples examined, so that infections with lambliae do not appear to be of major importance [386].

III. Contagious Infections

1. Smallpox

Smallpox (Variola; *chi-chăk*, چیچك) the germs of which are Paschen's inclusion bodies belonging to the viruses, is one of the diseases which have been known since antiquity and which have occurred in all parts of the earth. It is a contagious disease, chiefly spread by droplet infection and contact. The Asian countries have always been strongly affected, and only after the introduction of protective vaccination in modern times was of a few settlements only, at times branching out into other areas and similar to happenings in Iran [417], Turkestan and other countries of the East and of Central Asia [303]. Shortly before the war we had the opportunity to witness the misery of smallpox in not easily accessible mountain villages of the Hindu Kush and this made a marked impression on us.

Table XI and Fig. 13 (see back of *Map No 10)* provide information on the *number of smallpox cases registered after 1949.* For the years 1949 and 1950 they show relatively small numbers of infections, a fact probably due to the incomplete registration of cases. In the following years, however, the number of smallpox cases reported fluctuates between 1,000 and 2,180 annually. This would mean, assuming a sedentary population of 10 million people at that time [60, 100], that there was an annual infection rate of 10.0 to 21.8 for every 100,000 inhabitants. A comparison with India and Pakistan—average rate of 26.7 per 100,000; North West Frontier Province 6.0 cases per 100,000 inhabitants [477]—shows that figures given for Afghanistan are at an acceptable level and that the country, although more strongly infected than the adjacent districts of West Pakistan in the 'fifties, was by no means as severely hit as India and in particular as the most infected province, Orissa (45.1 cases per 100,000 inhabitants annually). Nevertheless, the figure had to give rise to concern since in a family, which lives together in a minimum of space under totally inadequate sanitary conditions, every single case contains the danger of epidemic outbreaks within as well as beyond the immediate communal group. There are no data on the frequency of smallpox among nomads, but it must be assumed that they too are infected by the disease at times, especially when they are in their winter quarters.

Since 1956/7, the number of infections has decreased rapidly. As a result, in the 'sixties, apart from one isolated rise to 554 cases in 1963, only single cases and insignificant local outbreaks have been recorded.

Map No 10 represents the *very different infection of individual provinces* in the period of the report from 1949—64, in which, however, the *population density* appears to be but *one* of the determining factors. The densely populated provinces of Jenoubi (45 inhabitants per km²), Kabul (33 per km²), Kataghan (30 per km²) and Parwan (28 per km²) for example, show an above average infection rate, but in equally heavily populated provinces of Ghazni (27 per km²) and Mashreqi (44 per km²) such small infection rates were observed during the entire period of the report and such high ones in the extremely thinly populated Farah Province (4 per km²) that in addition to the population density other factors too must obviously determine the degree of infection.

These are probably to be found in the natural quality of the landscape and *settlement form.* Larger towns like Kabul, Kandahar and Herat do not produce unusually high infection rates, and it would appear that smallpox

ance of which is in large part determined by localized outbreaks in the large residential quarters of towns.

b) Seasonal fluctuations in the frequency of smallpox are presented in Fig. 14 (see back of *Map No 10).* Ignoring some outbreaks which were limited in time and space, it becomes clear, unmistakably so at least for the period before 1955, that in Afghanistan smallpox is predominantly a *disease of the cold season.* In autumn the number of infections increases and reaches its maximum in the winter months; it recedes in spring and is at its lowest in summer. They show an annual contagious disease course which is explicable in terms of the way of life of people during the winter which is in turn conditioned by land and climate. It was only with the general reduction of the disease after 1956 when the number of cases registered became so small that a seasonal relationship was no longer to be recognized distinctly.

c) Clinical aspects. Concerning the seriousness of infections in different years no data which could be turned to account were available. Mortality apparently varies greatly; at times only a few deaths occurred, but in Badakhshan and Kandahar a death-rate of more than 50 per cent was observed in 1953 and 1954 [399], and smallpox certainly contributed to the high infant mortality of earlier times, a threat which lost its importance only with the general diminution of the disease.

d) Control of the disease. In earlier times the fight against smallpox in Afghanistan was limited to the practice of variolation with the contents of virulent pustules, a widespread practice in Asia which often did more harm than good. In the 1930's Berke [203] set up the first modern vaccination service and had already vaccinated about three million people in the country in the period 1936—39. The result was that infections of smallpox receded markedly in the protected areas.

In the post-war years this was taken up once more and in recent times the vaccine centre established in Kabul with the aid of WHO (532; vide page 92) has formed the basis for a comprehensive vaccination service which has in the meantime been placed on a juridical basis and is to include infants, schoolchildren and military service recruits. According to information furnished by "Survey of Progress" [133, 134], more than 2.5 million lots of smallpox vaccine were produced in Kabul in 1341 (1962/63), a total of 2.85 million lots in the year 1342 and in the following years [134 a] 185,330*, and 325,000 lots; about 140,000 lots were made in the year 1345 (1966/67). In addition to this, dried vaccine of Soviet origin has also been employed [386]. Hospital installations have been improved and facilities for isolation have been arranged; a mobile smallpox vaccination unit can be put into action, and already at this time a quite effective vaccination service can begin work, the activities of which find significant support in the information passed on by the *Rozantoon* Organization (vide page 91) and which has in recent

zar-i-Sharif Provinces, but since then the infection rate in the country has fallen to 1.7 and during the last two years even as low as 0.65—0.7 infections per 100,000 inhabitants.

This does not mean that there is no more smallpox in Afghanistan. Isolated cases and even small but localized outbreaks in remote areas are still facts to be taken into account. Even though they do not find their way into statistics, they still contain the danger of larger epidemics and it must remain the aim of the Afghan health authorities, together with the WHO, to determine and to improve the sanitary conditions of the endemic areas in order finally to overcome the danger of smallpox in the country.

2. Chicken-pox

Chicken-pox (Varicella; *āb-ī-chī-chāk,* آب چیچك) is regarded as a mild children's disease which occurs in almost every country on the earth but is not considered to be of any great importance.

In *Afghanistan* the disease is certainly widespread as a contagious infection, but in the report it only occurs in recent years: in 1343 (1964/65) 863 cases were noted and these were followed by 1,440 in the following year and by 2,314 in the year 1345 (1966/67) [134 a]. No data on the infection of individual provinces, and any seasonal fluctuations which possibly have been observed, have come to my notice.

Although the clinical diagnosis does not as a rule present great difficulties, varicella ought to be treated with the closest attention in a country in which smallpox still occurs at times. This is particular the case since a definite distinction from smallpox is scarcely possible in the absence of virological diagnosis.

3. Trachoma

Trachoma (Egyptian eye disease; *kōkrăh,* کوکره) also belongs to the group of contagious virus infections. In addition to the geographical and climatic qualities of the country, the way of life of the inhabitants and the sanitary conditions are chiefly responsible for the spread of the disease. As a rule, hot arid areas are especially strongly infected in cases where chronic irritation of the conjunctiva of the eyes by dust, wind and sun creates conditions favourable for the intrusion of the infection [472, 473]. Lack of water and especially the common use of dirty towels, which are often used for wiping the eyes of infected members of the family, effect the spread of the infection within the community group [391]. As vectors of conjunctival secretions flies also play a large role in the spread of trachoma [198, 380, 471].

Those *countries of the Middle East* which belong to the arid zone, the Asiatic part of Turkey, Iraq and

rains, the frequency of the disease decreases from the north to the south [402]. In the Soviet Central Asian Republics, however, the infection, reported to be 2.1 to 20 per cent, already appears to be considerably lower than in the other countries mentioned [472, 473].

It must therefore be assumed that in Afghanistan as well, trachoma is endemic in almost all parts of the country—an assumption which is supported by the great number of often partially or totally blind people to be seen on the streets. Regrettably enough data on the *de facto* distribution of trachoma are still quite incomplete and at times contradictory. When we examined food sellers, tea-room and restaurant owners in 1940 in Kabul—that is, a selected group of people checked from time to time—we found a 13.5 per cent infection by active trachoma [266], a result with which the findings of POIROT [416 a] who, in 1952, studied high-school students—i. e. a different group of people—in Kabul, comply quite well. MOUTINHO [391]. however, quotes a trachoma frequency in excess of 30 per cent for Afghanistan and its adjacent countries, and BAUM [198] noted in 1949 that 85 per cent of the patients attending his ophthalmic consultation in Kabul—again a selected group of people—were suffering from trachoma.

Only the inventories carried out in various areas of the country in recent years by the WHO and the Afghan Ministry of Health have given a somewhat more exact picture of the true distribution of trachomas in the country; the preliminary results were kindly made available to us, but can only be mentioned briefly here as these broadly-based investigations have not yet been completed. Thus in Herat for example, a total infection rate of 70.2 per cent (36.0% active, 34.2% scarred trachomas), and in the surrounding villages a rate of 63.3 per cent were noted; it reached 58.9 per cent (31.6% active, 27.3% scarred) in Kandahar and 35.6 per cent in the villages in the surroundings of Kabul [422]. On the other hand the infection rates are remarkably low in the north of the country (Mazar-i-Sharif: 13.2%) and in the eastern provinces (9%) [433]. However, in conclusion it may be said that in so far as it is possible to generalize from the available results, the assumption that more than 30 per cent of the population are attacked by trachoma once in their lives is justified. The degree of infection seems to be similar to that in several neighbouring countries, although there are great regional differences.

The Ministry of Health in Kabul, together with the WHO have started a programme to *combat* trachoma. It begins in the worst infected areas and lays most stress on the registration and treatment, if possible, of all infected persons—as well as striving for education in cleanliness and the elimination of troublesome flies. Results of this campaign are not yet available for publication; this note is only intended to show that when fighting trachoma, the Afghan health authorities together with WHO experts are attempting to tackle and to solve an

the disease has spread all over the world. In the course of time it receded in the temperate zones, but it is still widely spread in many tropical and subtropical countries. In the Middle East—from Arabia to Iran and Afghanistan—leprosy has been endemic for centuries, although not manifesting such high infection rates as in the humid tropical countries [223, 368].

Today leprosy is rare in Afghanistan. In the 'thirties LICHWARDT [361] reckoned that there was an infection rate of 0.5 per thousand, which would have meant about 5,000 leprosy patients in Afghanistan, given a population of 10 million at that time. In the course of four years, the dermatological clinic in Kabul has seen 163 leprosy patients, i. e. 0.24 per cent of all patients [297], while in the muncipal out-patient clinics, which attended in the main to internal diseases, leprosy remained an exception. GÜRÜN [297] estimates that a total of 25,000—30,000 lepers live in Afghanistan and that the disease is on the increase, while Afghan colleagues mention 250 to 300 people infected by leprosy—a figure which refers only to the position in the Hezarajat. Thus a definitive quotation on the true infection rate cannot be given, and even the comparative figures from Iran and Turkey—put at 2,000 and 2,500 to 3,000 respectively—hardly permit any conclusions on the frequency of leprosy in Afghanistan to be drawn. On the basis of my own observations I would assume that on the whole the disease is rare and that GÜRÜN's estimate probably greatly overstates the situation.

In the earlier times only the mountain country of Hezarajat was known as an *endemic area* of the disease; it is an area where leprosy is still endemic among the Mongol population of poor mountain farmers [266, 386]. Later a few more, and certainly unimportant, foci were discovered in Nuristan, in the southern provinces, near Kandahar and in the north of the country [297], so that apparently only the west of the country is completely free of leprosy. Beyond the border, in Khorassan, the Iranian leprosy areas extend as far as Mazanderan [387].

A special *susceptibility* on the part of *certain population groups* was still assumed by LICHTWARDT [361, 362], who saw the disease in Afghanistan only among members of the Mongolian group, and in Iran predominantly among the Turk population, and never among Pathans and but rarely among "true Iranians". It does seem unjustified, however, to base an assumption of racial susceptibility on these few pieces of information. Even if such a situation existed, we now consider leprosy to be chiefly a disease of poverty and misery. In the first line it affects the Hazaras, who live in the poorly cultivated Central Mountains, and whose resistance is reduced by malnutrition, as well as by lack of protein and vitamins. That members of other population groups also become infected, has been demonstrated by GÜRÜN's investigation [297, 358].

The number of lepers in the dermatological clinic

therefore appear that numerous patients are infected during childhood. In view of the slow moving start of the disease, it is for the most part impossible to reconstruct the onset of the first symptoms with any reliability.

According to the list compiled by the Kabul dermatological clinic—which no longer complies with current definitions—of the 157 cases which were analysed, the following clinical forms were observed:

Tuberculoid leprosy	17.2%
Lepromatous leprosy	14.7%
Maculo-anaesthetic leprosy	34.4%
Lepra mutilans	3.2%
Mixed forms	30.6%

This picture deviates markedly from the results arrived at in Turkey, according to which—among the inmates of a leper hospital, where a different disease cross-section is naturally to be expected—56.3 per cent of lepromatous and only 2.1 per cent of tuberculoid forms were found [447].

The planned *anti-leprosy campaign* is still in its first stages in Afghanistan. The infected persons mostly live in their villages and are advised and treated as far as possible in the nearest medical ambulatory station. Modern chemotherapeutics, such as DDS (*D*iamino-*D*iphenyl-*S*ulfone), are available in the leprosy areas. The plan to establish a leprosarium was first discussed in 1939, but in view of the more urgent health problems was postponed during the war. Now the setting up of a leper hospital in the Bamyan Province, the true endemic leprosy area, is being considered [386].

5. Tuberculosis

a) Distribution within the country. As in most countries of the Near and Middle East, so too in Afghanistan *tuberculosis (mărăz-i-sell,* مرض سل) has been widely spread until the present time. Indeed, after malaria, it quite possibly constitutes one of the greatest problems of public health [471], although concerning its extent only a few exact data are available. Already in the periods both before and during the war we saw many sick people with grave tuberculosis both in Kabul and in the rural areas, even though at that stage the possibilities of examination were inadequate, and we were convinced then that the disease was much more widely spread than in many other countries, particularly the European ones. Poverty and malnutrition, the living together of people in the most confined quarters, the inadequate airing of their homes and the poor heating in the cold season, but above all the unimaginable concentration of dust in the old houses and the way of life of the womenfolk who were veiled and practically excluded from light, sun and bodily exercise, have always markedly favoured the spread of the disease. Statistical data on the true extent prise only a fraction of total numbers really involved. This report does not therefore permit any conclusions on the true distribution of tuberculosis to be drawn.

On the other hand, the serial examination carried out in the Kabul grammar schools by French physicians in 1950, the results of which are listed in the following table, yielded a first survey on the distribution of tuberculosis among children and adolescents [462].

Age	Positive cutaneous reactions	
	Boys	Girls
6 years	11.90%	13.0 %
10 years	34.90%	28.75%
14 years	48.72%	43.0 %
16 years	49.60%	47.88%
20 years	73.21%	—
23 years	85.10%	—

With increasing age, girls as well as boys demonstrate an almost linearly increasing frequency of positive cutaneous reactions and indicate that practically every adult grammar school pupil in Kabul had already experienced a tuberculous infection at some stage of his life. Similar conditions are to be found among pupils in Lahore who—if one takes the average of all classes—showed a 67.77 per cent positive reaction [183]. Moreover the Kabul statistics relate to grammar school pupils, most of whom came from the economically better-off families; among the children of the poor, the graph of positive skin reactions must be presumed to rise considerably earlier and more steeply. But since no observations on the number of active, inactive or healed infections could be undertaken during the examinations, these studies, too, furnish only limited information and up to the present day we do not really know how far the disease is spread in the various provinces and towns or among different age or occupational groups.

b) There is similarly little information on the *clinical forms of the disease* in Afghanistan. In our out-patient clinics pulmonary infections were very prevalent and we chiefly encountered patients with far advanced open and cavernous pulmonary phthisis in which help was scarcely if at all feasible; cases at an early stage were much rarer. But apart from these there were numerous extra-pulmonary forms, especially bone and joint tuberculosis. Miliar tuberculosis and tuberculous meningitis on the other hand, were seldom found and skin tuberculosis, which is said to be rare in the other countries of the Middle East as well [216] hardly ever occurred among the patients of our clinics or in my own consulting room, although they were much more frequently noted by dermatologists [234].

Because many sick persons applied for medical care at too late a stage, and as in most cases they refused to stay in hospital for treatment and also continuously changed their doctors, the misery of tuberculosis together with

though simple in its installations, was followed by another one for women a few years later. Unfortunately no serial examinations aimed at the registration of infected persons could be carried out before the war, and during the war a radical extension of the protective service against tuberculosis was out of the question, although the necessity for such a service was discussed on several occasions [183 a].

So it was only in 1954 that the Afghan health ministry together with WHO experts, was able to take up the question of anti-tuberculosis measures once again and to set up a *Tuberculosis Centre* in Kabul in one of the former municipal out-patient clinics. This was in the Dirwasa-i-Lahori part of the town and was intended to permit the operation of a campaign against the disease not only in the capital but also in Jalalabad, Mazar-i-Sharif, Pol-i-Khumri and Kandahar from there. The centre was staffed by specialists and equipped with x-ray, photographic and radiographic apparatus, with the result that from then onwards serial examinations could be carried out in Kabul as well as in the provinces. Work began with the registration of children, school pupils and students of different age groups. In addition skin tests on remaining family members were carried out in cases of a positive result wherever and whenever this proved to be possible.

On the *scale of the operations initiated* no final account can as yet be drawn up since reports of the results have not yet been published. According to Survey of Progress [134]*, about 30,000 persons were examined by x-rays in 1341 (1962/63), in 1342 (1963/64) it was already 52,000 and by 1343 (1964/65) 64,500 persons. Thus a significant proportion of the younger population groups in several of the country's towns has already been registered and the scheme has probably been extended to the population of the rural areas already. It may therefore be assumed that there is now a much more complete picture of the distribution of the disease than there was at the start of the operation.

Besides the diagnostic recording, *prophylactic* measures have also been started; in the year 1341 (1962/63) 15,200 BCG protective vaccinations were carried out and this figure reached 17,100 in 1342 (1963/64) and 34,280 in 1343 (1964/65) [134]. In the years 1344 (1965/66) and 1345 (1966/67) the number of vaccinations was raised to 52,797 and 41,796, respectively [134 a]*.

This team has also taken over the *treatment* of patients detected in this manner and their numbers are reported to be rising continually-being given as 1,080 for the year 1341 (1962/63), 1,940 in 1343 (1964/65) and 2,020 in 1344 (1965/66) [134 a]. Such people not only come from Kabul in order to attend the health centre, but also travel from distant parts of the rural areas. Since the number of beds in tuberculosis hospitals is very restricted, the great majority of patients is advised Medicines such as Rimifon, PAS and streptomycin, as well as vitamins, dried milk preparations and soap for sick children, are distributed without charge.

Continuous x-ray controls are carried out and are also free of charge, and many patients, especially mothers with sick children—quite contrary to their former habits—have become accustomed to attending subsequent checks regularly and punctually. This is a fact which best demonstrates the population's implicit confidence in the tuberculosis centre, the work of which is supported by an intelligent campaign of enlightenment.

The *success* of this broad-based scheme can only be fully assessed when a detailed report on the results becomes available. So far it can only be assumed that although there is no enforced isolation and undoubtedly a great number of infections still take place within families, many tuberculous persons are effectively helped in a manner unknown in the Afghanistan of former years when it would have been regarded as impossible. The unflagging efforts of the physicians concerned as well as of their nurses and auxiliary staff, who are just as fully aware of the difficulties of their task as of the necessity of the work they have undertaken, appear the more praiseworthy because in the case of the anti-tuberculosis campaign results will manifest themselves only gradually in the course of years, whilst demanding a special degree of perseverance, patience and energy.

6. Influenza, Pneumonia, Meningitis and Encephalitis

a) Influenza. Over the last decades Western Asia has been beset on several occasions by *influenza epidemics* which at times spread as far as Europe and also to South East Asia. In 1950 a widespread epidemic of influenza-like character with infection of the respiratory organs was observed in Iran; it is not known whether this was a true virus-influenza. In the same year a mild outbreak of influenza occurred in Israel [280] and in 1952 some cases were identified here as of the B-type [312].

From *Afghanistan* an epidemic outbreak of influenza had been reported in 1949 [524]; a much more severe outbreak appears to have occurred in 1956 and 1957 [133, 524]. The further course of the disease frequency during the following years is illustrated by table XII which includes the influenza cases observed by and reported to hospitals in the period from 1952 to 1966 [133, 134, 134 a]. The number of persons treated for influenza as stationary hospital patients has fallen steadily in the 'sixties. Provided that these reports are complete, these declining numbers over the last years may by explained by the supposition that the improvement of care by family doctors allowed more patients than hitherto to be treated at home. In 1966/67, however, Survey of Progress again reported a large increase in the number of influenza cases [134 a]. But since the diagnoses are not virologically verified, it must be assumed

weather conditions and inadequate domestic heating may account for the increased susceptibility to colds and influenza infections in spring and autumn. However, influenza does not appear to be a significant problem for the Public Health Service in Afghanistan.

b) Pneumonias (sinăh-băghăl سینه بغل) occur in company with bronchial pneumonias (catarrhal pneumonias) in the course of influenza and colds as well as in the form of true *lobal pneumonias*. Epidemiologically they present no qualities which differ from those observed in other countries; in 1949, 692 cases were reported in the period from January to June [523]; further statistical data do not appear to have been published. In former years every instance of pneumonia in small children was regarded as decidedly dangerous and pneumonias contributed markedly to the high infant mortality. Only since the introduction of sulphonamides and antibiotica as well as the improvement of the general conditions for children due to better nutrition, have pneumonias become less dangerous than heretofore.

c) There are scarcely any reports on the occurrence of true *meningococcal-meningitis* (epidemic meningitis). As a cosmopolitan disease it probably occurs in Afghanistan as in other countries. But while in Iran 2,000 to 3,000 cases were reported annually in some years, e. g. 1958 and 1959, Afghanistan registered only single cases [529, 530]. Epidemic outbreaks in some towns or provinces or the seasonal fluctuations of frequency are not known, and from my own medical experience I can recall only some rare individual cases which, moreover, could not always be verified by bacteriological examination.

d) An epidemic outbreak of *encephalitis-like infection* numbering altogether 27 cases (14 deaths) was observed in a village near Maidan (Province Wardak), i. e. in the vicinity of Kabul, in May, 1958, together with similar manifestations among slaughter cattle [170] There was no indication of this encephalitis being insect-borne, and neither the nature of the disease nor its actual transmission—by contact or by foodstuff—were verified.

7. Hepatitis epidemica

Concerning the distribution of *Hepatitis epidemica* (virus hepatitis, epidemic jaundice) in Afghanistan, no statistical data has so far been published. It must be assumed, however, that the disease is endemic in the country and that similar to India, West Pakistan, Iraq and Israel, it also leads to epidemic outbreaks [335, 522]. On the basis of my own experience, I suppose that hepatitis occurs more often in Afghanistan than is the case in Europe under normal conditions. In Kabul we saw severe and obstinate cases at times; it possibly affected foreigners more severely than natives, with whom it may possibly pursue a midly course. FÜHNER [personal communications] frequently noticed the months exists in Afghanistan too, still remains to be investigated. In any case, however, it must be assumed that in the case of hepatitis as well, the true number of cases is much higher than is known to doctors, and this is especially true of the country areas where many patients never attend a surgery. It may be hoped that with the improvement of hygiene conditions, particularly in the case of the water supply and the disposal of garbage and sewage, hepatitis will, in the course of time, also become rarer.

8. Diphtheria

a) Distribution in pre-war times. In Afghanistan, as in most western Asian countries, *diphtheria (khŏnăq*, خناق) has been a rare disease late in the 19th and in the first half of the 20th century [266, 304, 317, 417]. I can remember only a few sporadic cases which I saw in Kabul before the war and in the first years after the war; paediatricians were more familiar with the disease, but they too encountered it comparatively rarely.

The causes of this rare occurrence of the disease throughout the entire western Asian area are unknown. The far smaller volume of traffic between the countries in earlier times and the few possibilities of contact—which are very important for the spread of many diseases of civilization—may have played an important role in this; so far there are no apparent reasons which might suggest the existence of an antitoxic immunity in the Afghan population such as possibly exists in the Punjab [382].

b) Distribution in modern times. Already during the war, but even more so in the years after it, an increase in morbidity from diphtheria appears to have occurred. In Table XIII, compiled on the basis of KANTER's data [324], the frequency of diphtheria in some European and western Asian countries, and relating in all cases to 100,000 inhabitants, is presented; the periods 1934 to 1938 and 1949—53 are compared. On the one hand the table shows that the disease occurs much more rarely in most western Asian countries than in Europe, Israel being the one exception and the fact probably to be accounted for by European immigrants. But apart from that it would appear that the disease becomes rarer the further east one moves; of all comparable countries, Afghanistan probably presents the lowest rate of infection—a fact which corresponds perfectly with my own experience and with that of other physicians working in the country [386]. It is, nevertheless, debatable whether the diagnoses made in the 'thirties were made correctly and some colleagues maintain that already in those days diphtheria was more frequent in Kabul than was accepted as being the rule.

On the other hand, the table shows that in the countries mentioned the frequency of diphtheria had, at

quency of diphtheria had increased, at least in the towns, during the 1950's [386]. Table XIV which contains the figures of cases recorded in the period 1948 to 1964, together with the morbidity rate related to 100,000 inhabitants in both instances, shows, in so far as it is possible to draw any firm conclusions on the basis of the few figures recorded, that in the first years after the war diphtheria was still rare in Afghanistan but increased distinctly in the early 1950's. However, already a few years later the rate of infection returns to its earlier and lower level, showing a renewed increase which commenced in 1963 and continued to the end of the period under report. Thus a constant increase in the frequency of diphtheria cannot be recognized. The disease comes and goes and the figures registered do not show any regularity in its course, although in recent times they did attain heights at times which had seldom occurred before. Thus in observing the disease over a period of many years it may still have become more frequent than had been assumed by the medical profession using wholly empirical evidence.

The causes of the increase in cases observed at times may lie predominantly in exogenous factors. The continuously increasing traffic with European endemic countries is probably a decisive factor; in addition to this the inadequate conditions of hygiene and the residential circumstances in the old town quarters create conditions favourable to its spread, with the result that once importation has taken place to a larger degree an increase in disease infection must be expected.

c) Seasonal fluctuations of frequency. Diphtheria is considered to be a seasonal disease which occurs mainly in seasons having frequent changes of weather. In Iran the peak of the annual graph seems to be in October and November—that is at the time of moving low atmospheric pressures—in Turkmenistan and Uzbekistan in autumn as well when sudden falls of temperature occur, and in India during the rainy season [566]. In Afghanistan a certain increase in infections during the transitional seasons may possibly be expected, but the number of cases reported is so low as to allow no conclusions to be drawn as to regularity in the seasonal occurrence. Smaller epidemics are said to occur chiefly in October [551], and because the disease does appear to contain a certain tendency to spread, increased attention should be paid to it in future.

d) I am not in a position to give reliable information on the *clinical course* among Afghan patients since I saw too few cases to permit me to form my own opinion. But I am inclined to assume that the disease, in a manner similar to that in southern Iran [304], takes a relatively mild course. Apparently it has not been held to contribute substantially to infant mortality which was so far high [457]. On the other hand, there are reports that severe cases followed by paralysis and heart complications have been observed; the prognosis is particu-

Measures against the disease have so far been limited to the treatment of individual cases; whether protective vaccinations are carried out on a large scale or only at times is not known to me.

9. Acute Exanthema

a) Measles (Morbilli; *surkhakān*, سرخکان) seem to have been known for a long time in Afghanistan and the adjacent countries of the Middle East. In Iran, Arabia and India they are said to have occurred epidemically in the second half of the 19th century [303, 417], and it is quite likely that outbreaks of that kind happened in Afghanistan as well.

In *recent times* (i. e. in the years during and after the war), we frequently encountered measles in Kabul. The following table shows the numbers of cases reported annually over the period 1949—64; it probably contains those which were statistically registered in hospitals—that is, only a fraction of those cases which actually occurred. For the most part children infected by the disease are treated at home, if medical advice is sought at all.

Measles in Afghanistan

Year	Cases reported	Year	Cases reported
1949	396	1957	1104
1950	463	1958	1196
1951	766	1959	958
1952	1652	1960	651
1953	2269	1961	3157
1954	1536	1962	2071
1955	1742	1963	1420
		1964	248

Despite all the fluctuations in the figures reported, the table shows that the frequency of measles has remained fairly constant over the course of years; in any case a distinct increase or decrease during the period covered by the report is not discernible.

The differing degree of *infection in individual provinces* too, is but incompletely reflected in the statistical material available. The only published information [548] shows that Kabul and Kandahar Provinces are clearly the most affected, an indication that measles is a disease of towns where life at close proximity in the old residential quarters is favourable to the spread of so contagious a disease far more than in the case of small villages or isolated farmsteads.

The *seasonal course* of the disease is evident from Fig. 15. Earlier reports already pointed out on several occasions the fact that in the Middle East measles occur increasingly in the cold season [266, 303, 417]. The monthly means of infection numbers over a longer period of years (1952—63) on which Fig. 15 is based, shows that although measles can occur in Afghanistan through-

frequent in earlier times, has been recorded at 50 per cent for untreated babies [457]. Besides smallpox and whooping cough, measles have always caused a signi-

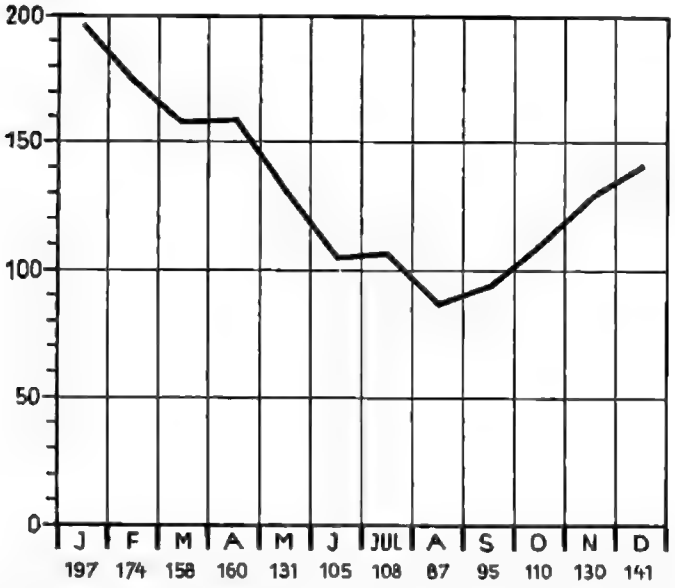

Fig. 15. *Measles in Afghanistan 1952—1963;* monthly means of cases recorded during the single months of this period. [Compiled from Communication Inst. Publ. Hlth. (386)]

ficant proportion of the high infant mortality—an observation which has also been made in a similar way in the case of Iran in the 19th century [417]. But in more recent times paediatric care has made considerable progress, confidence in hospital treatment has grown, the resistance of children has increased in the towns at least, thanks to better care and nutrition, and above all the dreaded complications can be prevented or suppressed by the sulphonamides and antibiotics, with the result that the disease has lost much of its terror; in medically well-serviced areas mortality now amounts to 1—3 per cent [457, 551]). Nevertheless, measles are still considered as a serious disease by paediatricians in Kabul.

b) Scarlet fever (Scarlatina; *măkhmălăk,* مخملك) appears to have remained practically unknown until modern times throughout the entire Middle East. At the close of the 19th century, the coastline of Asia Minor was considered to be the eastern frontier of its distribution; Syria, the then Mesopotamia, Arabia, Iran and probably India as well, should have been practically free of scarlet fever [303, 317, 417].

Even in the first half of the 20th century, scarlet fever was *extremely rare* in the Orient, the Middle East and the Soviet Central Asian Republics. In the 'twenties Syria had a morbidity rate of 0.5 per 100,000 inhabitants [207]; in Uzbekistan one case was observed among 57,000 children [164] and in Tashkent there was a single outbreak with a total of 21 cases [207]. In Afghanistan I did not see a single definite case in the years 1938—41; colleagues working in clinics and practices reported in a similar manner, so that the the 1950 to 227 in 1951; in Israel only 518 cases were observed in 1949 but this rose to 1,311 in 1950 and to 1,232 cases in the first six months of the year 1951 [498]. In Iran the number of scarlet fever infections increased from 54 to 624 annually in the period 1950 to 1953, and the disease is now well known in Teheran.

In *Afghanistan,* too, scarlet fever appears to have immigrated in the course of its move to the east. Thus in 1948 for the first time 110 cases were recorded; in 1949 there was a drop to 41 cases, and since then no further infections have been reported. But at the present time it is said that occasional cases of scarlet fever do occur in Kabul, even though the disease is *still rare* [386].

On the causes of the spread of scarlet fever to the east in recent times, just as little is known as about its former absence in the western Asian area. It is probably a matter of complex epidemiological events [207], in which traffic from country to country, which has grown rapidly in the post-war years, constituted only one, albeit significant, factor.

Thanks to its rare appearances, scarlet fever is no great problem for the Public Health Service of Afghanistan; nevertheless, it would be welcome if the few cases that do occur could be registered in the future as this is the only way of observing a possible further migration of the disease to the east.

c) German measles (Rubeolae; *sŭkhăkăn-chăh,* سرخکانچه) appears to be rare in Afghanistan and I cannot recall having seen any definite cases during my years in the country. It is possible, however, that the paediatricians in Kabul come across German measles more often; so far relevant reports on the distribution and frequency of the disease have not been published, and considering the mildness of the disease it appears to be of subsidiary importance.

10. Whooping Cough

a) Frequency and distribution. In Afghanistan and its adjacent territories *whooping cough* (pertussis; *siāh sŭrfăh,* i. e. "black cough", سیاه سرفه) is a well known children's disease. However, it is scarcely possible to detect a clear picture of its true *frequency* and *distribution* in the country. For reasons already mentioned above, the records are incomplete, especially so since children suffering from whooping cough frequently receive no medical treatment at all. According to my own observations, I consider whooping cough to be a frequent but not inordinately wide-spread disease in Kabul, although I am unable to substantiate this opinion with statistics; it is quite likely that paediatricians hold quite different views on the frequency of the disease. Table XV presents the number of cases reported during the period 1952—67, i. e. in hospital and therefore only a small proportion of the cases which did in fact occur; it thus does not reveal the true frequency of the disease

No detailed data on the *rate of infection of individual provinces* or towns can be given; it is also not known whether epidemic outbreaks occurred only in the residential quarters of the towns or in the country areas as well.

Seasonal fluctuations of frequency can also not be assumed on the basis of the available data. As in other countries, so probably in Afghanistan too, neither season nor climate or weather exercise an influence on epidemic accumulations. Only in Iran do reports suggest [564] a relationship between whooping cough and the hot and dry summer months—a phenomenon the cause of which has as yet not been investigated.

b) Clinical aspects. Although whooping cough does not appear to be too frequent a disease, it has always been greatly feared. Before the introduction of modern medicines, complicating broncho-pneumonias as well as disturbances of the circulation were extremely frequent, especially among weak and undernourished babies and, without being able to give exact figures, we know that the mortality has always been very high.

But in the course of the last twenty years whooping cough mortality has receded markedly, not only in America and Europe but also in many Asian countries. In the Federal Republic of Germany it fell from 2.64 per cent in the year 1949 to 0.92 per cent in 1959; in the 'fifties Iraq [525] reported a mortality of 1.5 per cent (according to Epidem. Vit. Stat. Rep. 5, 323 [537] but in 1952 below 0.5 per mille) and in Afghanistan too, where whooping cough—besides smallpox, measles and intestinal infections—used to be one of the major causes of the high infant mortality, a fundamental improvement has taken place in recent times. Naturally babies continue to be more in danger than older children, but on the whole the effect of sulphonamides and antibiotics, more efficient medical care and the improved general condition of the children have reduced the dangers of the disease substantially, so that in this field too, in any case in towns, conditions have improved greatly. Progress already achieved in the towns may, however, set in at a much slower pace in the rural areas.

11. Mumps

Mumps (Parotitis epidemica; *kâlâ-chărăk*, کله چرك) is well known to paediatricians in Kabul, but there are no reports available concerning the frequency and distribution of the disease in town and country with the result that no account of disease geography can be given. Since it is a mild disease, rarely followed by complications, it is of subordinate importance in connection with geomedical problems.

12. Poliomyelitis

Poliomyelitis is an infectious disease caused by a

Most *western Asian countries*—with the exception of Israel—have reported only few clinically manifest infections during the past 15 to 20 years [279, 408, 533, 544]. The Asiatic part of Turkey is considered to be an endemic area with single cases occurring from time to time, but epidemic outbreaks only seldom [409]; no observations on the possible existence of endemicity in the remaining countries of western Asia have been published.

But the continuous *increase* of infections also observed in western Asian during the past 10 to 15 years is remarkable. Over the period 1950—57, the number of cases reported annually increased from 49 to 301 in Iraq, from 3 to 47 in the Lebanon and from 71 to 101 paralytic cases in Iran in 1959 and 1960, the majority of which were of course observed in Teheran and in the immediate environs of the town [171, 533]. But in spite of this increase in the number of infections, poliomyelitis still appears to be a relatively rare disease in these countries even in the most recent times.

In *Afghanistan* poliomyelitis as a clinical disease was not known in earlier times; before and during the war in any case no acute paralytic cases were submitted for observation. We are informed by Afghan colleagues that the disease was imported early in the 1950's and has spread fast since then—an opinion which appears to be feasible but cannot be substantiated by me. In any case neurologists as well as orthopaedic specialists in Kabul are now familiar with late sequelae of poliomyelitis.

Details on the *clinical course* of the disease and the rates of infection in certain age groups have so far not been reported from Afghanistan. In Iran, 87 per cent of infections were recorded for babies and infants in their first three years of life. Mortality among children is estimated to be high, e. g. 50 per cent in Kabul [457]. In western Asia, in Turkey as well as in India, the type-1 virus seems to predominate [408, 409]; corresponding data from Afghanistan are lacking. Even seasonal fluctuations in frequency, such as occur in Europe, were only sporadically observed in the Middle East; in Iran an increase in the number of cases was observed in summer, but in Iraq and the Lebanon this was in spring, and otherwise the disease appears to occur throughout the year [409].

Further details are not available. More time is required to see how the epidemiological pattern of disease is going to develop in future and whether the increase in mortality observed so far is going to continue; it would be useful to gain an insight into the situation of immunity among the population by investigating the question of antibodies.

13. Infectious Mononucleosis

One of the contagious infections is *infectious mononucleosis* (previously known as *Pfeiffer's glandular*

children's disease which had been assumed earlier; similarly to poliomyelitis there were no infections within families and a seasonal fluctuation could also not be discerned.

14. Tetanus

Infections with *Clostridium tetani* intrude into the human body mainly by way of wounds contaminated by earth. In most countries of the Near and Middle East the disease is probably widely spread. While in the Federal Republic of Germany four lethal cases of tetanus infection for every million inhabitants are registered annually, in Iraq 100 to 300 cases, i. e. 15 to 30 deaths for every million inhabitants, were reported each year in the period 1953—57 [535]. No statistical data are available for *Afghanistan*, but according to clinical experience the disease seems to occur frequently, so that everybody who stays in the country for a longer period would be well advised to take advantage of active immunization.

15. Noma

In addition *noma* (cancrum oris) should be mentioned, although it is not a contagious infection in the strict sense but rather a complication arising in the course of other infectious diseases and chiefly among children. It is an infection of the cheeks caused by unknown germs, which leads rapidly to a serious deterioration of the tissue and frequently to death. In Europe the disease has become rare. We repeatedly encountered it in Kabul [266]; in the space of two years REYNAUD [446] observed about 30 cases, for the most part among undernourished children having a low resistance. Mortality is cited at about the 50 to 75 per cent level, but, thanks to planned treatment with penicillin, REYNAUD was able to effect cures in 76.9 per cent of cases among older children.

IV. Anthropozoonoses

This is a group of etiologically and epidemiologically differentiated infections which occur in animals but may also be transmitted to man. Some of the diseases are widespread in western and central Asia, but because there are scarcely any utilizable data available on the occurrence of anthropozoonoses in Afghanistan they can only be briefly considered on the basis of data from neighbouring countries which have been published.

1. Brucellosis

The *brucelloses* are infections caused by several closely related germs (e. g. *Brucella abortus, B. melitensis, B. suis)*, which occur epizootically among domestic

Throughout the cattle breeding areas of the entire Near and Middle East brucellosis appears to be far more widely spread than had been assumed on the basis of earlier observations. In Turkey, Israel, the Lebanon, Syria and Iran, rates of infections between 20 and 43 per cent—*B. abortus* as well as *B. melitensis*—were observed only a few years ago among cattle, whereas human infections have always been rare [168, 240, 256, 546]. In the North West Frontier Province, however, brucellosis was practically absent among dairy cattle [465], while in the Punjab animal as well as human infection is endemic [377].

No systematic investigations on the distribution of brucellosis in *Afghanistan* are so far available. WUNDT [546] notes that cattle and sheep brucelloses have been observed in the Kabul district in the years 1953—57, but there is no further information and even the most recent Survey of Progress [134 a], published in 1967, does not contain any information on brucella infections in Afghanistan. *Human* infections were not seen by me either in the 'thirties or at the beginning of the 'fifties, but it must be assumed that they do occur at times. In the extensive cattle raising areas in the north of the country particularly, the existence of brucellosis must definitely be assumed. Human infections are probably relatively rare, even there, since milk is, almost without exception, consumed only after it has been boiled, so that the fresh cheese prepared in the rural areas is probably the most important and possibly the only foodstuff of importance in its transmission. But in any case it would appear to be necessary in the context of improvements in cattle and sheep breeding, which are considered to be very important in recent times [134 a], to carry out investigations on the degree of infestation of the herds as well as of the human population. Such a mode could provide a survey on the true brucellosis distribution in the different provinces and such measures appear to be of especial importance for the newly opened-up areas in the south.

2. Anthrax

Anthrax (siāh-sākhm, سیاہ زخم) is an infection of domestic animals caused by *Bac. anthracis* which can be contracted by man through contact with infected animals or infectious animal products. Those who are exposed to the disease are chiefly slaughterers, stock owners, tanners and all workers in abattoirs and firms handling rags. In the clinical sense anthrax is to be distinguished in its skin, lung and intestinal forms.

There are reports of numerous infections in the Asiatic part of Turkey as well as from Iraq; in the 1950's the number of cases reported rose to a high as 1,758 annually in Turkey [514]. In *Afghanistan* anthrax occurs enzootically among sheep and sporadically with

3. Rabies

Rabies (Lyssa; *mărăz-i-săg-i-dewānăh* مرض سگ دیوانه) is a viral epizootic infection which occurs in all the continents and is transmitted to man by the bite of infected animals. In the countries of the Middle East it is chiefly stray dogs, as well as wolves and jackals [193, 235, 287] and in India tigers, monkeys and cats as well that are infected [167], but as far as man is concerned, dogs are undoubtedly the most important source of infection.

In *Afghanistan* too, the disease is frequent among dogs. Although to date no figures on the frequency of its occurrence have been published, the problem of rabies is one well known to doctors and bacteriologists over the past years. As early as the 1930's, the Bacteriological Laboratory in Kabul started to immunize persons who had been bitten by dogs suspected of being infected by rabies, by vaccinating them with inactivated or dead viruses. But at that time only patients living in or near Kabul could be safeguarded.

Today the vaccination service has been considerably enlarged. In the year 1341 (1962/63) 44,000 ampoules and in 1342 (1963/64) somewhat more than 56,000 ampoules of vaccine were produced at the Vaccine Centre in Kabul [133, 134]. For the same years the number of patients who were immunized was quoted as being 436 and 378 respectively, but in the ensuing years the production of vaccine has been much reduced [134, 134 a], probably as a consequence of decreasing demand. At the same time, over the last years about one to two thousand ampoules of vaccine have been regularly produced for veterinary purposes [133, 134, 134 a], so that protection against rabies can now be carried out quite effectively.

4. Other Anthropozoonoses as yet Unrecorded in Afghanistan

In the following, some further epizootics which can be transmitted to man will be mentioned; they have so far not been brought to medical attention, but their occurrence seems to be a possibility.

a) Leptospiroses. Leptospiral infections are not only widely spread among rodents but also among other mammals such as foxes, dogs, horses, cows, cats and pigs. Man can acquire the infection through contact with infected animals or their excretions. The disease manifests itself as septicaemia with ensuing damage to the organs such as the liver.

In Israel and Iran numerous strains like *L. canicola, L. grippo-typhosa, L. hyos, L. icterohaemorrhagiae* and *L. pomona* have been verified among livestock [335, 439]; in Iran *L. grippo-typhosa* was also found among people.

Since *Afghanistan*, especially in its northern provdated; probably the inhalation of infected dust (hay, straw, dry tick excretions) and direct contact with infected animal excretions are the most important ways of transmission. The human disease follows the pattern of an obstinate bronchial pneumonia.

In Turkey as well as in Israel, Iraq, northern Iran and the Soviet Central Asian Republics, livestock are seriously infected in some parts; in some places in Tajikistan Soviet researchers found specific antibodies in 13 to 24 per cent of all the persons examined, an indication that human infections, too, are widespread. Thus almost the entire Iranian-Turanian area apparently constitutes a single vast, much infested, endemic unit [210, 283, 289, 310, 325, 326, 337, 350, 427, 428, 438, 456, 487, 494, 549].

In *Afghanistan* Q-fever has so far never been identified. In fact we do know of disease patterns which were interpreted as "viral pneumonias" but could not be firmly established as such by microbiological or serological examination. But since grasslands, steppe regions, countries with extensive agriculture and large herds of cattle, and particularly areas with migrating herds (nomads!) are specially favoured [494], it must be assumed that in Afghanistan, and especially in the north, the infection is endemic just as in the neighbouring countries. It should be the aim of the veterinary and health services to elucidate this question and, if need arises, to embark on the counter measures which may be necessary.

c) *Plague (tā-ŭn,* طاعون) is unknown in Afghanistan at the present time. A final epidemic outbreak is said to have moved through the country from Kabul to the Helmand Valley in 1905 [434], but since then the country is said to have been free from plague.

But north of the Amu Darya there is a large area of *enzootic rodent plague* stretching from China across the Central Asian steppes to Kurdistan, where the disease is always kept alive by the fact that resistant *(Meriones persicus, M. libycus)* and susceptible rodents *(M. tristami, M. vinogradovi)* are living side by side [186, 190, 192, 194, 196, 291, 434, 531]. Vectors within the rodent populations are the fleas of the *Xenopsylla, Nosopsyllus* and *Stenoponia* species, which, although specific rodent fleas, occasionally suck blood from man as well [194, 348]. Epidemiologically this Central Asian plague must therefore be considered as being distinct from the Indian form, which is maintained by bandicots (Bandicota; Muridae) in some places and by rats in others [418, 459, 467].

That this rodent plague can also establish contact with man is proved by the "accidental" outbreaks in Kurdistan observed at the beginnings of the 1950's [531]. Admittedly these are rare because rodent fleas have little contact with man in these thinly populated endemic areas and visit him only as a substitute host. But once an infection has occurred within a social com-

plague becomes important for the caravan traffic, so that further investigations into the question of rodents and their ecto-parasites in northern Afghanistan appear to be desirable.

d) From Afghanistan, as from the remaining countries of the Middle East, no information has been published on *toxoplasmosis* which occurs as a natural infection among numerous kinds of animals, most frequently among dogs, and can also be transmitted to man.

V. Venereal and Dermatological Diseases

1. Venereal Infections

It must be assumed that in Afghanistan, as in other countries of the arid western Asian area, in addition to venereal syphilis, the *endemic non-venereal syphilis* also occurs [216, 296, 306]; among the nomads in particular it is said to be endemic [36, 234]. The infection is for the main part contracted in infancy, but not congenitally. Nothing is so far known about the frequency of infections among individual tribes or different age groups.

In former times opinions were very much divided on the distribution of *veneral syphilis* among the Afghan population. In our municipal out-patient clinics, which were specialized in internal medicine, we scarcely ever saw venereal diseases and were inclined therefore to rate their frequency at a low level only. CUTLER [234] on the other hand, working in a special ambulatory unit—i. e. with another selected group of patients—saw signs of fresh or healed specific infections among 8.4 per cent of the patients in Herat and among 50 per cent of those in Kabul.

However, new examinations carried out by WHO experts [401], did produce an essentially different picture. Thus, in the early 1950's among 7,768 patients of a special ambulatory unit in Kabul—that is, once again a previously selected groups of patients—only 29 (27 males and 2 females) were diagnosed as suffering from fresh primary syphilis, 79 (53 males and 26 females) from the secondary form and 241 (158 male and 83 female) from latent sero-positive syphilis, and THIERS and his associates [496] found a total of 80 syphilis infections at different stages among 3,534 patients in Kabul. Thus both groups of statistics show an infection rate of 4.5 and 2.3 per cent respectively within the groups of patients examined. The majority of infected persons was made up of unmarried men between 20 and 30 years of age. Primary and secondary stages occurred in all their usual forms; tertiary changes were often observed as serious ulcerations of nose and palate, while aortitis and other visceral forms were seen as

Gonorrhoea (sozák, سوزاك) appears to be the most widely spread of the veneral diseases and it was found on 290 occasions (recently infected cases only!) in the circle of patients by PARANJPE and his team. Again, as in the case of syphilis, unmarried men in the 21 to 30 year age group were the most affected. Unspecific post-gonorrhoeal catarrhs of the urethra were frequently noticed but other complications during the course of gonorrhoea were seen but rarely [401].

In Kabul, as indeed everywhere in the Orient [216] *Ulcus molle* and *Lymphogranuloma inguinale* seem to be scarcely known; PARANJPE [401] only saw a total of 12 cases of soft chancre among his 7,000 or more patients.

Hence it follows that *venereal diseases are by no means as frequent* in Kabul as had, on the basis of earlier observations, been at times expected. Islam, the rules of which are still strictly observed among large parts of the population, demands premarital chastity and marital fidelity, and there is no public prostitution in Kabul which might serve as a source for infections [401]. It must be admitted, however, that modern traffic from country to country and an increasing neglect of religious injunctions in recent times do favour the spread of venereal infections.

Women are but seldom affected by venereal diseases; according to GADE [282, 401], only 21 or 0.6 per cent of 3,500 pregnant women at the Shararah clinic were found to be infected venereally. In most *occupational groups* the infection rates were small. The students of some faculties at the university were completely free of infections; only in one teacher training college, most of whose pupils had come from the western provinces, was a rate of infection of 4.4 per cent found and this was mostly of a congenital syphilis type; the inmates of the workhouse and the prison also manifested higher rates of infection. On the whole the WHO experts accept a *mean rate of infection of 2.2 per cent* of venereally infected persons, a figure based on a test of 7,160 anamnestically and clinically healthy inhabitants of the town and its immediate surroundings carried out in the period between March, 1952, and August, 1953.

By the beginning of the 1950's the WHO had already contributed significantly to the *campaign* against venereal diseases by establishing a special clinic and supplying specialist staff. It was extremely difficult to carry out the planned programme. It was hardly ever possible to identify contacts; many patients arrived with protracted disease processes and the women in particular, who were still veiled at that time, were naturally reluctant to be examined and treated by the clinic's doctors. Nevertheless, in consideration of the relatively favourable state the disease had reached, it was possible to close the clinic in the autumn of 1953 and to

2. Non-venereal Dermatological Diseases

Purely dermatological conditions are to be discussed only briefly together with a few examples, the information about which is based on my own not very extensive experiences. Naturally enough we saw relatively few skin cases at our municipal out-patient clinics and it should be an aim of dermatologists engaged in Afghanistan to provide a up-to-date and detailed report on this important special aspect of the discipline, as was last done by THIERS and his associates [496].

The superficial *mycoses*, among which *favus* is most feared on account of its chronic qualities, are widely spread. THIERS [496] saw a total of 185 (i. e. 5.2%) favus patients among 3,534 subjects at the dermatological ambulatory unit in Kabul, a frequency which fails by a large margin to attain the infection rates which then existed in some parts of Iran. *Microsporosis*, *trichophytosis* and *pityriasis versicolor* also belong to the range of superficial fungoid infections which occur frequently.

We frequently encountered *Molluscum contagiosum*, which is caused by a virus and appears to be widespread throughout the Near and Middle East, and we often saw bacterial dermatoses such as *impetigo*, *acne* and *pyodermia*—as THIERS had done—among the poorer classes of the population particularly; these people live under inadequate conditions of sanitation and are not in a position to attend to the matter of skin cleanliness and care.

Vitiligo, which depends on a loss of skin pigmentation, is widespread in all tropical and sub-tropical countries and appears to be common in Afghanistan as well, while *psoriasis*, which was often encountered by THIERS, was but seldom observed by us, as is said to be the case in some other areas of western Asia, for example Israel [491].

Pellagra-like changes of the skin, caused by *deficiency diseases* and accompanied by desquamation and hyperkeratoses, were observed on several occasions. As for *occupational dermatoses* among bakers, bricklayers, cobblers, tanners and others—which seem to be remarkably frequent in Iraq [216]—I am unable to provide information from my own experience; typically industrial dermatoses (e. g. oil exzemas) probably occur only rarely at present but will increase in the future. For further details on dermatological diseases occurring in the country the reader is referred to THIERS et al. [496].

VI. Helminthic Diseases

Infections with parasitic worms of the most varied types are much more frequent in most warm countries, even those of the arid zones, than in northern Europe. Climatic peculiarities, agriculture on irrigation, the manuring with human faeces and the consumption of infected foodstuffs, create conditions for the development of numerous worm-diseases. In the following only those human helminthiases will be considered, which are characteristic of Afghanistan and its adjacent territories, and that without regard to zoological systematics, however, a complete review of all worms which may possibly occur in the country must be foregone. The few reports published so far concerned with helminthological examinations carried out in Afghanistan show that it is just in this field that most important results are to be expected which will be equally important for the fight against disease by both human and veterinary medicine.

1. Echinococcosis

Evidently, *echinococcosis* is the main helminthological problem in Afghanistan. The adult *dog tapeworm (E. granulosus* and E. *multilocularis)* inhabits the intestines of dogs *(E. granulosus)* and other wild-living canine animals *(E. multilocularis)* which void cast-off segments or eggs with their faeces. The intermediate hosts are domestic animals such as sheep and cattle, and in Asia these also include goats, buffaloes and camels. These become infected by taking in segments or eggs with the fodder, and typical hydatid cysts develop in their organs. Even man, when he comes into close contact with dogs, can become a carrier of cysts through oral infection by worm eggs. The disease, which has extremely serious consequences, is caused by the development of cysts in the liver, lungs and other organs. Dogs pick up the infection with *E. granulosus* from butcher's scraps which contain cysts; wild canine animals do so by eating infected field mice—among other sources—and these latter, in northern Europe at least, act as intermediate hosts to *E. multilocularis.*

It has been known for years that echinococcus occurs in man in *Afghanistan*, but there are no data available on the frequency of the disease—in 1962/63 10 cases were reported in Kabul [386]—or on the extent of infection of the intermediate hosts, so that only a com-

Echinococcus granulosus in the Middle East

Town or country	Cyst in					Adult worms in dogs %	Author
	cattle %	sheep %	goats %	buffaloes %	camels %		
Lebanon	47.0	11.6			67.4	11.75 32.9	PIPKIN et al., 1951 [414]
Syria and Beirut	45.7		13.8—27.8		100	20—25	TURNER et al., 1936 [501]

parison with neighbouring countries permits an assessment of Afghan conditions. The table page 125 provides a review of the distribution of echinococcus in several towns of western Asia, which shows that the entire Middle East, as far as it has been investigated, presents one heavily infected endemic area.

What is valid for neighbouring countries may be assumed to be valid for Afghanistan too. Here, also, domestic animals are probably infected to a high degree and particularly in the cases of the rural and nomadic population contact with domestic animals and dogs carries with it the danger of infection. When animals are slaughtered in rural areas or on caravans, this is mostly carried out in the open air, with the result that dogs have access to practically all the offal and there are therefore many opportunities for infection. The degree of infection of the numerous stray dogs is unknown. In European houses in Kabul, KULLMANN [346] found that about 21 per cent of the dogs were infested with adult echinococcus; a year after informing the dog owners of the dangers of the infestation and its avoidance by meticulous feeding, he found only one infestation among twenty dogs.

Only the cystic form, that is the *E. granulosus*, seems to occur clinically in Kabul and also among patients from other parts of the country. The cases which I saw were lung echinococcus; how frequently liver echinococcus occurs at the same time is unknown to me. By contrast, in Baghdad about 61.4 per cent of the patients were suffering from liver echinococcus and only 15 per cent from lung echinococcus [250].

North of the Amu Darya, *E. alveolaris*, larva of *E. multilocularis*, is also endemic and causes about one third of the cases observed there [179]; whether it occurs in northern Afghanistan will require investigation.

The control measures have already been outlined by LEHMENSICK [355]. But it will prove to be difficult to interrupt the chain of infections among the nomads and the rural population since people cannot be isolated from domestic cattle, nor can the infection of dogs be prevented fully. The training of meat inspectors—Kabul has now got its public slaughter-house—will certainly procure success more readily in town. A further necessity is the removal of stray dogs and in addition domestic dogs should be examined for worms from time to time.

2. Taeniasis

The *beef tapeworm (Taenia saginata;* Taeniidae, Cestoidea) which lives as a cysticercus in the muscle tissue of cattle and as an adult worm in the intestines of man, is said to be widespread in the Lebanon, in Iraq and in Iran and particularly so among the poor population which prefers the cheaper beef which is often eaten as *kebab* which has been insufficiently roasted [173, 341, 393]. Among the Afghan population which eats

3. Infections by Intestinal Nematodes

a) *Hookworms* (Ancylostomatidae, Nematoda) are parasites of the hot humid tropics and sub-tropics. In Asia, both kinds, *Ancylostoma duodenala* and *Necator americanus*, are widely spread. The larvae live in loose soil which is moistened by fresh water; they bore themselves through men's skins, and after moving through the organism they develop into adult, blood-sucking worms in the upper parts of the small intestine, thus causing progressive anaemia, pain in the region of the digestive organs and circulatory disturbances.

In the Middle East, the Caspian lowlands, the coastal area of the Persian Gulf and Iranian Seistan are strongly affected in certain-parts—in some places even as highly as 40 per cent [185, 258, 320, 393]; but in Lahore an infection rate of only 12.92 per cent was found in 1959 [165].

In *Afghanistan* hookworms have never presented a significant danger factor. The dry highland is hardly able to furnish suitable conditions for development of the larvae and even in the lower lying areas in the east and west of the country no definite findings have so far been reported. As late as 1965, hookworms were found among 0.5 per cent of all pupils in a school in Kabul, so that in principal the existence of hookworms must be acknowledged.

It is difficult to predict whether the newly-exploited agricultural areas in the south of the country will always remain free of hookworms. Introduction from neighbouring Seistan is possible and conditions favourable to the development of larvae should exist in fields watered by irrigation unless the dry heat can effect a rapid parching of the surface. In any case, examinations for hookworm infestations among the sedentary or newly-settled populations at regular intervals are recommended.

b) *The remaining nematodes which are parasitic in human intestines* such as *Ascaris lumbricoides, Oxyuris vermicularis, Trichostrongylus colubriformis* and *Trichuris trichiura*—all of which occur in the Middle East [173, 184, 185, 383, 393, 484, 485, 508]—will not be considered in detail here. It must be assumed that they often occur in Afghanistan as well, and some of them are known well from my own experience. But since no precise data on the their frequency and distribution in the country has been published it is necessary to omit any detailed discussion.

4. Trichinosis

Human infections with *trichina (Trichinella spiralis;* Trichinellidae, Nematoda) are so far unknown in Afghanistan. The problem of trichinosis has, however, gained unexpected significance since KULLMANN [343, 344, 345] first established the existence of muscular trichinosis among wild animals—swamp lynx *(Felix chaus)*, wolf *(Canis lupus)* jackal *(Canis aureus)* and red fox *(Vulpes vulpes)*. It may be assumed that so far it is a matter of

low-lying areas in which both the larvae of the worm and the snails which act as intermediate hosts find good conditions for their development. The larvae *(miracidia)* which hatch from worm eggs passed out into water by an infected person, develop into swimming *cercariae* inside freshwater snails. They penetrate the injured skin of man and develop into adult worms and cause a chronic bladder disease. Agriculture based on irrigation, the rinsing of laundry in water which contains cercariae, bathing and even the ritual ablutions in infected water can have the effect of spreading the disease.

The endemic areas of the Middle East are found in southern Iran and Iraq, where over the recent years bilharziasis has in some places spread rapidly where new agricultural areas based on irrigation have been opened up [176, 241, 393, 509, 510, 511]. In *Afghanistan* the existance of the disease has so far not been established beyond doubt. The mountainous highland with its cold and for the main part fast-flowing rivers does not offer the right conditions for the development of cercariae and their intermediate hosts. Only the Iranian-Afghan border country in the Helmand area is said to be rather sporadically affected [236, 237], and this raises the question whether the newly developed agricultural areas in the south of the country may possibly become endemic areas at some stage. So long as it remains uncertain whether snails suitable to act as intermediate hosts are living there no prognosis is possible. Nevertheless, as far as the observations noted above are concerned it might be advisable to investigate the area from time to time since it is climatically well suited for the development of bilharziasis, for *S. haematobium* and snails which act as intermediate hosts.

Intestinal bilharziasis (S. mansoni) is unknown throughout the entire Orient and Middle East [582].

b) *Liver flukes (Fasciola hepatica;* Fasciolidae, Trematoda) appear to be widespread among grazing stock in western Asia and in northern Afghanistan [346, 393], but human infections have not so far been reported. Nothing is known about the occurrence of *Dicrocoelium dendriticum* (small liver fluke; Dicrocoeliidae, Trematoda) in Afghanistan [346].

c) The *Dracunculus medinensis (Medina worm;* Dracunculidae, Nematoda), the larvae of which develop in *Cyclops,* a crustacean, is transmitted by drinking water which has been contaminated by infected specimens. In Afghanistan it has been endemic, if at all, only in the environs of Balkh [259, 364, 367], but for a long time it has been quite unknown in the country. The nearest endemic areas are probably those on the Persian Gulf.

d) Infections with *filariae* (Filariidae, Nematoda) are unknown in the arid highlands of Afghanistan and there is no reason to believe that individual cases, which might possibly be imported, will spread in the country as experiences in neighbouring countries have demonstrated [218, 244, 259, 445, 476].

1. Cardiovascular Diseases

A fact remarkable above all the others was the frequency of *arterial hypertension.* About 7 per cent of the patients attending my consulting hours suffered from high-pressure complaints and these were often under relatively small increases of pressure which would probably have gone unnoticed by hypertension patients in our home countries. Women (9.1% of all patients), particularly in their menopause years, were more often affected than men (5.5%). In almost all cases it was a matter of essential hypertension and instances of renal hypertension were scarcely encountered in the consulting room.

A satisfactory explanation for the frequent occurrence of complaints due to hypertension in Kabul is lacking, although a reaction to life at high altitudes does suggest itself. But by contrast with our observations the drop in blood pressure at extreme altitudes above 4,000 metres in the South American Andes for example, is striking; this is a fact which has been interpreted as a reactional dilitation of the vessels due to the low partial pressure of oxygen [307, 363]. However, the effects on the circulation which occur at such extreme altitudes cannot simply be compared with those at Kabul (1,803 m.). Most probably the continuous pressure increases among foreigners in Kabul should be regarded as inadequate adaptation in the sense defined by v. Muralt or Selye; the reason for its occurrence among natives as well remains obscure. Moreover, it might be noted that contradictory observations have also been made; Raoult de la Vigne, for example, stresses the rarity of hypertension [442], a fact which may be explained by the different clientel of the psychiatrist as compared with that of a specialist for internal diseases.

As at the high altitudes of the Andes [307, 363] *cardiac infarct* was also rare among the Afghan population in Kabul and probably throughout the entire country and the phenomenon is probably to be related more to the less hectic way of life of the Afghan population than to coronary circulation which is supposed to be better at high altitudes.

Functional heart complaints of all sorts are very frequent whereas *endocarditis* and organic valvular diseases resulting from it were observed on relatively rare occasions. *Arteriosclerosis* in its various forms, however, appears to occur comparatively often [386]. For details on *acclimatization* and *heat stress* the reader is referred to page 75.

2. Diseases of the Stomach and Intestines

In pre-war days it was noticeable how seldom *gastric* and *duodenal ulcers* occurred among the diseases of the stomach and intestines, whereas in the 1950's we found ulcus much more frequently, and according to the information from Afghan colleagues [386] gastric and duodenal ulcers appear to be on the increase.

sent day whether the sprue-like disease patterns which undoubtedly occur and are often observed in Afghanistan, do in fact constitute the true sprue or are actually old gastric and intestinal catarrhs, attended by diarrhoea, and practically complete absence of ferments.

3. Carcinomas

As in many other countries of the East, cancers were formerly extremely rare in Afghanistan. During my first stay in the country, a period of 3½ years, I saw only 4 cancer patients among thousands of patients (carcinomas of the stomach and bone-metastases). This observation is one which was confirmed by other doctors working in Kabul, and POLAK stresses that even in his time cancer was extremely rare in Iran [266, 417].

But in the post-war years carcinomas have also increased, possibly on account of the improved diagnosis, possibly as a result of the increased intake of cancerogenic stimuli or even because of the longer life expectation of people generally. As far as the statistics are concerned, gastric and bronchial carcinomas seem to predominate, whilst cervical cancer appears to be unknown or at least very rare. In the statistics of the Ministry of Health, 77 malignant tumours of all types were registered in the year 1341 (1962/63), amongst which there were 8 cases of gastric and 8 cases of bronchial cancer, a distinct indication that carcinomas have become more frequent as compared with our earlier observations [386].

4. Endemic Goitre

The *problem of goitre* presents some special features in Afghanistan. In neighbouring Iran, goitre was not observed at all in former times [417], and it was only more recently that some endemic areas have become known in the north of the country [331]. Nonetheless, an extensive area of goitre extends across the entire central mountain ranges of Middle Asia from the Pamir across the Himalaya to Nepal and the interior of China [303], and the endemic occurrence of goitre in the high mountain valleys of Afghanistan, just like the goitre zones north of the Amu Darya in Tajikistan and Uzbekistan, seems to be related to the other areas of Central Asia where goitre is endemic.

There is dispute over the etiology of goitre occurrences. Lack of iodine does not appear to be the cause in the southward stretching valleys of the Himalaya [331], while a connection between the frequency of goitre and the lack of iodine apparently exists in West Pakistan, Tajikistan, Uzbekistan and the north western slopes of the Pamir, with the result that one is inclined to suspect similar relationships in Afghanistan. So far no analyses of water from the Afghan goitre areas have been published, but goitres apparently occur chiefly in high mountain valleys, the water supply of which is derived from ancient rocks. But on the other hand goitres

5. Urinary Concrements

Uroliths appear to occur frequently [266, 386], and Afghanistan probably belongs to the great area of urinary concrements which stretches from Arabia across Israel, Iran, Iraq, West Pakistan and the Hindu Kush into the Soviet Central Asian Republics, covering the entire arid Western Asia [212, 303]. We did in fact encounter urinary concrements, remarkably frequently in Kabul and large outlet stones of the bladder were found even among small children. In the Afghan disease statistics too, stones are well known, but unfortunately no distinction has been made between the stones of the pyelon and those of the bladder [386].

So far no analytical studies of the structure of the stones have been published and the cause of their formation is therefore unknown. Bilharziasis must be dismissed as a cause and it has never been proved that the development of concrements is a result of avitaminosis. The investigations carried out by FRANK's team in Israel may possibly provide a clue [278], by suggesting that one of the main causes of the formation of stones might be found in the insufficient replacement of water, great quantities of which are lost by inapparent transpiration, in the arid zones and the consequent excessive concentration of urine.

6. Other Diseases

The organic diseases of the *skeleton*, the *rheumatic* affections and the *metabolic disturbances* will not be discussed here since they do not represent qualities in their frequency and course which are characteristic of the country. However, it is worth mentioning chronic *bronchitis caused by emphysema* among hashish smokers on the one hand and the rarity of *damaged intervertebral disks* on the other. This is especially the case among the rural as well as the poor urban people who for the most part sleep on the hard ground, and stands in contrast to the frequency of the complaint among city dwellers equipped in the modern way, as for example in Teheran where damaged intervertebral discs are said to be commonplace.

No investigations are available in the case of Afghanistan on the various *anaemias*, the *thalassaemia* and *haemoglobic anomalies*, some of which have already become well known in India and Iran; investigation into them would present a worth-while task for physicians interested in haematology.

Among the neurological-psychiatric diseases the frequency of *epilepsy* and *debility* is noticeable, whereas *schizophrenia* and *paranoia* are apparently observed relatively rarely. *Multiple sclerosis, amyotrophic lateral sclerosis* and other diseases of the spinal system do not appear to present any special features [442].

Questions of paediatrics have already been mentioned on several occasions in connection with the infectious diseases. Here it is only necessary to point out once more

In the meantime a great deal has also been done in the field of *children's welfare*. With the aid of WHO and UNICEF the Afghan health authorities were already able to achieve visible success by instructing mothers on the necessary care of children, improvement of their nutrition, the dispensing of vitamins and food preparations, tuberculosis welfare, prophylactic vaccination and the medical supervision of kindergardens and schools. It is true that the misery of undernourished and sick children is still considerable, but on the whole—judged by the impressions I gained during my last visit to Kabul—the general condition of children appears to have improved in essence. Paediatricians in Kabul also confirm this view and the infant mortality is now estimated at 15 to 30 per cent by foreign observers [75, 155].

In conclusion the progress in child care ought once more to be stressed, since it is of especial importance because the younger and growing generation is involved which is the group expected to carry on the development of the country in the near future.

Conclusion

Since the epidemiological inter-relationships and the measures taken against the diseases in each case have already been discussed in presenting the different diseases and disease groups, it is not necessary to add a detailed epicrisis to the ideas which have been put forward so far; only the results of the investigations carried out will be briefly recapitulated.

Apart from the rain forest zones of the true tropics, there are probably scarcely any countries which permit the *relationships which exist between regional character and disease* to be recognized so clearly as in the arid areas of the Middle East. On the one hand the establishment of certain species of anopheline mosquitoes is dependent on the region, i.e. the soil with its biotopes, and on the other on the climate; the type of vectors living in the country in turn determines the annual course of malaria. Cholera attacks the Iranian-Turanian highland as a migrating disease, but it has never been endemic in Afghanistan as it was in the areas at the mouths of the great rivers in humid-tropical India, since the arid highland with its fast flowing rivers does not offer suitable conditions for the "nestling" of the disease. The occurrence of enzootic plague in the areas north of the Amu Darya and in Kurdistan as well as the epidemiology of the leishmaniasis, i. e. the presence of the cutaneous and absence of the visceral forms, are further examples of the close *connection between soil, climate, animal reservoirs and vectors of the diseases.*

Furthermore the *way of life of man* in a country not yet opened up by technical progress, is also equally much dependent on soil and climate and is coequally decisive in the closing of chains of infections. Prior to the introduction of insecticides, an effective protection against mosquitoes was inconceivable in the old-style houses in town or country. Against this, the custom in the arid zones of sleeping out of doors in summers makes possible malaria infection of man by vector species of *Anopheles* which are little if at all house-bound. Agriculture based on irrigation and the use of contaminated surface water from the irrigation channels create sources of infection which do not exist in areas with own epidemiological laws; nomads are potential carriers of malaria and typhus and they have brought cholera into the country on several occasions. The endemic nonvenereal syphilis which occurs among the migrant tribes is definitely a disease of the arid zones. So it once again becomes clear how far *soil, climate and the way of life of man* conditioned by them act *together* to determine the distribution and routeways of many diseases.

On the other hand it was shown that Afghanistan as a geomedical region cannot be considered in isolation. Comparisons with adjacent territories have confirmed that the countries of the Iranian-Turanian area, which have for a long time been regarded as a *geographical unit*, must *also be taken as such in the epidemiological sense.* Many of the country's epidemiological qualities point to the north. The transmission of leishmaniasis in northern Afghanistan corresponds with that in the areas north of the Amu Darya; the vectors of malaria are in part the same both north and south of the Oxus; the distribution of helminthes in northern Afghanistan demonstrate that they have several features in common with the Soviet Central Asian Republics. One day the epidemiology of endemic goitre in Afghanistan might permit the recognition of certain analogies with those of the northern Pamir valleys. Other epidemiological conformities point to Iran and Baluchistan. Thus Afghanistan presents, in the *epidemiological sense, a unity with the neighbouring countries of the Middle East.*

Obviously there are *geographically, climatologically and even epidemiologically different zones* within a country so very much divided orographically. The role of the Hindu Kush should be stressed once again, not only as a geographical and climatic but also as an epidemiological barrier between northern and southern Afghanistan, as is demonstrated by the distribution areas of certain species of anopheline mosquitoes, by the epidemiology of leishmaniasis and the special qualities of enzootic plague in the areas north and south of the mountains. To a much lesser degree the Sulaiman Mountains also present an epidemiological barrier—as indeed we once suspected in earlier times. But apart from that

endemic diseases presents only a single aspect, albeit a most significant one. Ignoring the initial attempts to control diseases which took place in the pre-war period and which were in almost all cases of merely local character, the establishment of a health service began in post-war times and the systematic measures taken against diseases in connection with it are scarcely older than twenty years. During this period the Afghan government, together with specialist advisers from the WHO and UNICEF, has carried out the campaign against malaria, typhus, cholera, smallpox, tuberculosis and other diseases of general importance in a methodical way and the tables, diagrams and maps which supplement the text permit everyone to appreciate what a measure of success has been achieved in a short time.

No critical reader will assume that the infectious diseases have thus been eradicated and from time to time some local outbreaks of malaria or smallpox will certainly occur once more. It must even be assumed that cholera will once again move out from its endemic areas and that it may also reach Afghanistan. Such things are inevitable and in the end must be treated as a matter of fate. But what is decisive is the manner in which the country will meet such hazards, and the results of the campaign waged against diseases over the last two decades lead us to believe that the circumstances which could check any unexpected disease outbreak are much better than in former times.

Hand in hand with the fight against diseases the development of the *health service* and the *medical profession*, as well as the establishment of *institutes* and the *university*, has been pushed ahead. The university chairs are coming to be filled more and more by indigenous specialists, but partnership with overseas faculties has permitted beneficial co-operation in the case of visiting lecturers, successful teaching activities and, as a next step, the carrying out of scientific research in different specialist fields.

There is no shortage of special *tasks for the future*. Many large and costly projects under the aegis of the Public Health Service, some of them closely connected with the economic development of the country, must be tackled or continued. There are numerous examples and one could cite water supplies, sewerage systems, the setting up of additional hospitals in the provinces, the improvement of nutrition for the relief of deficiency diseases, measures against tuberculosis, trachoma, smallpox and any possible fresh outbreaks of malaria and the further expansion of medical supervision in schools and business—to name but a few. But anyone who has worked in the medical profession in Afghanistan for several years both before and after the war and has had the chance to revisit the country in very recent times, will wholeheartedly appreciate what has been achieved in the past years and will also face further development with confidence. Such development will include not only technical, chemical and medicamentous aids, but also the instruction of the population through the media of broadcasting and the press on the importance of measures against diseases and for public hygiene.

The young Afghan doctors are fully aware of the importance of the task assigned to them. With progressive development being continued, we should share their confidence with the same conviction and should assist them in solving their problems wherever we can.

Tabelle I. *Monatsmittel der Temperaturen in Afghanistan* gemessen an 16 verschiedenen Stationen des Landes. Aus: HERMAN [55]

Stationen Stations	Höhen in m [a] Altitude in metres [a]	Temperatur in °C / Temperatures in °C												Jahres-mittel Annual mean
		J	F	M	A	M	J	J	A	S	O	N	D	
Baghlan	510	2,6	5,9	10,9	16,0	20,8	26,0	27,0	25,2	21,1	14,6	6,6	2,2	14,9
Farah	651	7,1	11,1	16,0	20,4	25,6	31,4	34,4	29,5	25,4	19,5	11,5	8,5	20,0
Ghazni	2183	–4,6	–2,7	4,4	10,4	15,3	20,9	23,0	22,0	17,4	8,7	2,3	–2,0	9,6
Herat	964	4,0	6,4	10,5	16,5	22,1	26,7	29,4	26,2	22,7	15,6	7,9	4,0	16,0
Jabul-uz-Saraj	1628	3,6	7,6	10,2	14,2	19,4	24,8	27,9	24,5	22,2	17,4	9,3	4,5	15,5
Jalalabad	552	8,3	12,1	16,1	20,9	26,7	33,1	33,3	32,1	29,0	22,0	13,2	8,9	21,3
Kabul Air port	1803	–1,3	0,8	6,6	11,8	16,1	22,0	24,4	23,4	19,6	12,7	4,8	0,8	11,8
Karizimir	1860	–1,8	–1,7	5,2	10,5	15,4	19,1	22,6	20,4	17,1	11,3	4,0	0,0	10,2
Kandahar	1030	5,3	9,5	13,8	19,1	25,1	29,9	31,5	29,3	24,8	17,6	10,1	6,5	18,5
Khost	1185	4,9	9,9	11,9	16,5	22,0	28,5	27,9	26,3	23,0	18,1	10,7	5,7	17,1
Kunduz	430	4,2	6,5	10,7	16,7	22,1	28,7	31,5	28,9	23,8	16,2	8,5	3,4	16,8
Lashkargah	780	6,1	10,8	15,6	20,2	24,6	30,5	32,2	30,0	24,4	17,6	10,7	6,8	19,1
Mazar-i-Sharif	378	3,9	6,7	10,8	17,2	23,1	28,8	31,6	28,9	23,4	16,3	7,2	3,6	16,8
Maimana	854	3,2	5,7	8,0	14,4	19,1	24,6	26,9	24,9	19,6	14,1	8,1	3,3	14,3
Salang North	3350	–9,0	–5,9	–3,8	0,8	2,7	7,0	9,3	9,6	3,4	1,0	–5,0	–6,5	0,3
Salang South	3100	–5,7	–4,8	–3,2	1,6	5,3	10,2	12,2	11,8	8,1	4,7	–2,2	–5,6	2,7

[a] Höhenangaben nach HERMAN

Table I. *Mean monthly temperatures in Afghanistan* taken at 16 different stations in the country. From: HERMAN [55]

[a] Altitude according to HERMAN

Tabelle II. *Mittlere täglich*
in Kabul und Kandahar. N

Table II. *Mean daily devia*
Kandahar. According t

Monat / Month
Januar / January
Februar / February
März / March
April / April
Mai / May
Juni / June
Juli / July
August / August
September / September
Oktober / October
November / November
Dezember / December
Jahresmittel / Annual mean

Tabelle III. *Mittlere Niederschlagshöhen (mm) in Afghanistan 1958—1963,* gemessen an 16 verschiedenen Stationen des Landes. Die Trockenperiode (monatlich weniger als 20 mm Regen) ist durch das umrandete Feld gekennzeichnet. Nach: HERMAN [55]

Stationen Stations	Höhe in Meter [a] Altitude in metres [a]	J	F	M	A	M	J	J	A	S	O	N	D
1 Baghlan	510	35,5	31,2	50,7	65,9	40,4	0,6	0,0	0,0	1,1	0,2	0,0	6,2
2 Farah	651	2,2	8,8	24,2	17,6	9,3	0,0	0,0	0,0	0,0	0,0	1,6	11,4
3 Ghazni	2183	24,4	33,7	74,4	84,9	32,4	3,8	22,0	0,5	0,0	0,3	14,3	32,6
4 Herat	964	21,1	23,3	73,2	47,3	19,3	0,2	0,0	0,0	0,2	0,0	16,8	29,8
5 Jabul-uz-Seraj	1628	5,2	52,6	102,2	153,5	64,1	1,2	4,4	0,2	1,3	4,8	30,8	24,0
6 Jalalabad	552	19,8	21,7	38,0	28,6	9,2	0,4	11,0	3,6	0,0	4,4	19,1	20,5
7 Kabul	1803	12,4	52,3	75,5	106,8	35,1	2,0	5,9	1,1	0,2	1,2	40,2	15,9
8 Kandahar	1030	21,6	20,8	58,2	46,0	13,3	0,0	0,0	0,0	0,0	0,0	13,6	51,3
9 Karizimir	1860	25,1	58,7	119,2	130,4	44,0	1,8	2,0	1,0	0,8	4,6	52,2	22,8
10 Khost	1185	0,0	6,4	51,0	61,8	73,4	16,5	96,3	91,9	54,4	10,8	4,3	15,4
11 Kunduz	430	32,2	34,3	49,5	63,8	41,0	0,0	0,0	0,0	0,0	6,6	36,2	21,3
12 Lashkargah	780	1,2	6,8	28,5	26,9	8,5	0,0	0,0	0,0	0,0	0,0	1,4	15,9
13 Maimana	854	36,3	53,8	79,9	87,3	65,3	4,8	0,0	0,0	0,1	8,7	40,2	31,8
14 Mazar-i-Sharif	378	28,0	32,3	42,5	45,3	16,0	0,3	0,0	0,0	0,0	1,6	20,6	26,9
15 Salang North	3350	36,5	170,2	267,1	267,8	253,1	11,3	6,5	1,0	6,9	21,0	90,8	77,0
16 Salang South	3100	37,5	122,7	249,5	332,7	200,8	6,6	6,1	1,0	1,6	11,2	106,5	99,1

[a] Höhenangaben nach HERMAN

Table III. *Mean annual rainfall (mm) in Afghanistan,* stations in the country. The dry season (less than 20 m the framed part of the table. Accord

[a] Altitude according to HERMAN

Tabelle IV. *Blutgruppenverteilung in der Bevölkerung Afghanistans und einiger Nachbargebiete,* umgerechnet auf das 0AB-System

Table IV. *Distribution of blood groups in the population of Afghanistan and some adjacent territories,* converted to the 0AB-system

Gruppe / Group	Anzahl der Untersuchten / Persons examined	Blutgruppenanteile in % / Rates of blood groups in per cent A	B	0	AB	Aufteilungsschema n. Ottersberg / Arrangement according to Ottersberg	Autor / Author
Pathans (Afghanistan)	835	29	32	28	11	B > A > 0	Maranjian [81]
Pathans (Kabul)	556	27,5	30,9	31,5	10,1	0 > B > A	Inst. Publ. Health, Kabul [7]
Pathans (Quetta)	?	31,3	33,3	29,3	6,1	B > A > 0	Malone u. Lahiri nach Boyd [11]
N.W. Frontier Province (West Pakistan)	101	23,8	39,6	27,7	8,9	B > 0 > A	Chaudhri [16]
N.W. Pakistan	?	24,48	34,78	30,64	10,10	B > 0 > A	Khan [12] a. bei Boyd
Tajiks (Afghanistan)	1355	29	31	29	11	B > 0 = A	Maranjian [81]
Tajiks (Kabul)	538	31,6	30,9	27,0	10,6	A > B > 0	Inst. Publ. Health, Kabul [7]
Tajiks	?	41,6	22,6	24,1	11,7	A > 0 > B	Martin u. Saller [82]
Hazaras (Afghanistan)	171	24	32	37	7	0 > B > A	Maranjian [81]
Hazaras (Kabul)	650	25,0	29,9	37,4	7,7	0 > B > A	Inst. Publ. Health, Kabul [7]
Hazaras (Quetta)	?	25	39	32	4	B > 0 > A	Malone u. Lahiri nach Boyd [11]
Uzbeks (Afghanistan)	74	43	20	24	12	A > 0 > B	Maranjian [81]
Uzbeks (Turkestan)	?	33,9	27,0	29,4	10,6	A > 0 > B	Biasutti [6]
Turkomans	?	33,9	27	29,4	10,6	A > 0 > B	Martin u. Saller [82]
Inhabitants of Punjab	?	20,58	32,83	33,33	13,23	0 > B > A	Boyd [12]
Baluchs (Quetta)	?	24,3	24,3	47,2	4,2	0 > A = B	Malone u. Lahiri nach Boyd [11]

Tabelle V. *Krankenhäuser und Zahl der Krankenbetten in Afghanistan* in Beziehung zur Einwohnerzahl der einzelnen Provinzen in alphabetischer Reihenfolge. Stand vom Herbst 1967. Zusammengestellt nach: Surv. Progr. [133, 134, 134 a], Mittlg. Inst. Publ. Hlth. [386] und Statist. Rep. Min. Hlth. [482]

Abkürzungen:

H = Krankenhaus
CH = Staatl. Krankenhaus
MH = Männerkrankenhaus oder Männerabteilung
WH = Frauenkrankenhaus oder Frauenabteilung
MMH = Krankenhaus des Minenministeriums
MPWH = Krankenhaus des Arbeitsministeriums

Table V. *Hospitals and number of beds in Afghanistan* habitants of the various provinces in alphabetic order Surv. Progr. [133, 134, 134 a], Communication Inst. P Min. Hlth. [482]

Abbreviations:

H = Hospital
CH = Civil hospital
MH = Men's hospital or men's ward of a hospital
WH = Women's hospital or women's ward of a hospi
MMH = Hospital Ministry of Mines
MPWH = Hospital Ministry of Public Works

No.	Provinz / Province		Hauptstadt / Capital		Krankenhäuser / Hospitals	Bettenzahl	
	Name	Einwohner in 1000 (abgerundet) Inhabitants in thousands (rounded off)		Einwohner in 1000 (abgerundet) Inhabitants in thousands (rounded off)		Number of beds	
1	Badakhshan	317	Faizabad	58	Faizabad	25	
2	Badghis	294	Qala-i-Nao	70	Qala-i-Nao	10	
3	Baghlan	573	Baghlan	92	Baghlan, CH Pol-i-Khumri CH Textil-Ges. H / Text. Co. H [a] MMH [a] Zuckerraff. H / Sugar Factory H [a]	14 10 84 12 10	
4	Balkh	325	Mazar-i-Sharif	40	Mazar CH Maternity Ölges. H / Petrol Co. H [a] Balkh CH	 65 10 20 10	
5	Bamyan	318	Bamyan	44	Bamyan	15	
6	Chakhansour	112	Zaranj	16	Zaranj	15	
7	Farah	289	Farah	26	Farah Shindad	15 10	
8	Faryab	399	Maimana	51	Maimana Andkhoi	25 15	
9	Ghazni	718	Ghazni	40	Ghazni	25	
10	Ghor	297	Chakhcharan	56	Chakhcharan	20	
11	Hilmend	292	Bust-Lashkargah	26	Girishk CH MPWH [a] Lashkargah Nad-i-Ali Char-i-Angin	 20 30 50 20 14	

Tabelle V (Fortsetzung) / Table V (continued)

No.	Provinz / Province		Hauptstadt / Capital		Krankenhäuser / Hospitals	Bettenzahl	G d i.
	Name	Einwohner in 1000 (abgerundet) Inhabitants in thousands (rounded off)		Einwohner in 1000 (abgerundet) Inhabitants in thousands (rounded off)		Number of beds	T o tl
12	Herat	630	Herat	66	Herat		
					MH	40	
					WH	20	
					Maternity	10	
					Ghorian	10	
13	Jawzjan	396	Shiberghan	50	Shiberghan	15	
14	Kabul	1 177	Kabul	425	Kabul Aliabad incl. Tbc.	500	
					WH	300	
					Wezir Akbar H	180	
					Avicenna H	110	
					Maternity Schararah	65	
					Tuberkulose-Sanat. Frauen / Women	67	
					Armenhaus / Poor Law H [a]	15	
					Gefängnis H / Prison H [a]	52	
					MPWH [a]	50	
					Inst. of Technology H [a]	40	
					Baghman	15	
					Mirbacha Kot	10	1
15	Kandahar	682	Kandahar	117	Kandahar		
					MH	62	
					WH	35	
					Marzel Bagh H [a]	20	
					Kandahar Highway H [a]	8	
					Kandahar Flughafen H / Airport H [a]	25	
					Maternity	10	
16	Kapisa	317	Tagab	65	Tagab	10	
					Sarobi [a]	15	
17	Kunar	303	Assadabad (fr. Chigaserail)	26	Assadabad	10	
18	Kunduz	373	Kunduz	74	Kunduz		
					CH	10	
					Spinzar H [a]	50	
					Khanabad		
					CH	10	
					Hazrat Imam	25	
19	Laghman	204	Metarlam	67	Laghman	8	
20	Logar	284	Baraki-Barak	46	Baraki	25	
21	Nangarhar	752	Jalalabad	45	Jalalabad		
					CH	40	
					Maternity	10	
					Univers. H [a]	80	
					Ganihel	4	1

22	Paktia	551	Gardez	30	Gardez		
					MH	30	
					WH	10	
					Khost	15	
					Ali Kheel (Jaji)	10	
					Zurmat	20	
23	Parwan	815	Charikar	84	Charikar	30	
					Gulbahar [a]	30	
24	Samangan	190	Aibak	35	Aibak	15	
25	Takhar	454	Taluqan	61	Taluqan	10	
					Rustaq	10	
26	Katawaz-Urgun	512	Katawaz	34	Katawaz	10	
					Urgun	5	
27	Urozgan	485	Urozgan	43	Urozgan	13	
28	Wardak	382	Maidan	50	Maidan	2	
29	Zabul	329	Kalat	46	Kalat	10	
	Summe	12 770					27
	Nomaden	2 458					
		15 228					

[a] Krankenhäuser unterstehen nicht dem Gesundheitsministerium, sondern Gesellschaften oder dem Arbeits- und Minenministerium.

[a] These hospitals are not under the control of the Mini
dustrial Companies, to the Ministry of Public Works or to

Tabelle VI. *Fleckfieber in Afghanistan 1948—1964*
Zahl der jährlich in den einzelnen Provinzen gemeldeten Fälle.
Zusammengestellt nach WHO-Berichten [513]

Table VI. *Typhus in Afghanistan, 1948—1964*
Number of cases annually reported in the various Pro
Compiled from WHO Reports [513]

	Einw. in Mio Inhab. in Mio	Einw. pro qkm Inhab. per qkm	1948	1949	1950	1951	1952	1953	Summe/Total 1948—1953	Fälle pro 100 000 Einw. Cases per 100,000 inhab.	1954	1955	1956	1957	1958	1959	1960	1961	19
1 Badakhshan	0,4	10	—	—	—	—	—	1	1	0,25	1	—	—	—	—	—	—	—	
2 Farah [a]	0,3	4	—	—	—	—	—	—	—	0,0 [a]	1	—	—	6	—	—	—	—	
3 Ghazni	0,8	27	—	—	—	—	16	9	25	3,1	7	—	1	—	—	—	3	—	
4 Herat	1,1	9	24	1	84	86	59	188	442	40,2	17	—	3	1	—	—	—	—	
5 Jenoubi	0,9	45	19	99	25	57	97	5	302	33,6	11	3	—	10	—	—	—	—	
6 Kabul	1,3	33	58	255	278	476	100	11	1178	90,6	8	25	3	6	—	1	1	2	
7 Kandahar [a]	1,1 (1,4)	7	33	1065	763	49	25	7	1942	138,7	—	1	—	5	—	—	—	—	
8 Kataghan	0,9	30	32	3	22	17	1	—	75	8,3	1	3	—	1	—	—	—	—	
9 Maimana	0,4	16	49	9	—	—	6	9	73	18,3	—	1	—	2	6	36	—	—	
10 Mashreqi	1,1	44	—	222	27	18	8	—	275	25,0	—	—	—	—	—	—	—	—	
11 Mazar-i-Sharif	1,0	18	9	181	132	14	—	—	336	33,6	—	—	—	2	1	—	—	2	
12 Parwan	0,7	28	—	—	—	—	44	100	144	20,6	17	1	—	2	—	3	—	—	
Summe [b] Total	10,0	15	224	1835	1331	717	356	330	4793	47,9	63	34	7	35	7	40	4	4	

[a] Da Farah in der Berichtszeit noch nicht als selbständige Provinz meldete, wurden die 0,3 Mio Einwohner bei Kandahar zugeschlagen. Zahl in Klammern.
[b] Etwa 2,0 Mio Nomaden blieben bei der Fleckfieberberechnung unberücksichtigt. Gesamte Bevölkerung des Landes betrug damals etwa 12,0 Mio.

[a] Since Farah did not report as an independent prov
0.3 million inhabitants have been added to Kandahar. Nu
[b] About 2 million nomads are not included in this figu
about 12.0 million.

Tabelle VII. *Typhus abdominalis in Afghanistan 1948—1951*
Zahl der in den einzelnen Monaten gemeldeten Erkrankungsfälle. Zusammengestellt nach WHO Wkly Fasc. Singapore Bd. XXV, Suppl. 3, 1952

Table VII. *Typhoid fever in Afghanistan, 1948—1951*
Number of cases reported in each month of the year. Compil
from WHO Wkly Fasc. Singapore, Bd. XXV, Suppl. 3, 19

Jahr Year	Total	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1948	1129	←			837		→	39	46	46	51	55	55
1949	378	86	49	3	29	7	42	39	24	52	21	11	15
1950	757	331	22	2	18	324	32	12	1	4	4	3	4
1951	499	1	5	8	22	30	187	66	49	52	32	30	17

Tabelle VIII. *Typhus abdominalis und Paratyphus in Afghanistan 1948—1966*
Zahl der jährlich (gregorianische und afghanische Jahre) gemeldeten Fälle. Zusammengestellt nach Surv. Progr. [133, 134, 134 a], Mittlg. Inst. Publ. Hlth. [386] und WHO-Berichten [513]

Table VIII. *Typhoid and paratyphoid fever in Afghanistan, 1948—1966*
Number of cases annually reported (given for the Gregorian and Afghan calendar). Compiled from Surv. Progr. [133, 134, 134 a], Communication Inst. Publ. Hlth. [386] and WHO Reports [513]

Jahr Year (Gregorian)	gemeldete Typhus-Fälle Cases of typhoid fever reported	Afghan. Jahr Afghan year	gemeldete Typhus-Fälle Cases of typhoid fever reported	Jahr Year (Gregorian)	gemeldete Paratyphus-Fälle Cases of paratyphoid fever reported
1948	1129				
1949	378				
1950	757				
1951	499				
1952	577			1952	41
1953	1511			1953	10
1954	667			1954	10
1955	219			1955	63
1956	315			1956	33
1957	200			1957	34
1958	286			1958	2
		1338 (1959/60)	425	1959	31
		1339 (1960/61)	560	1960	9
		1340 (1961/62)	745	1961	84
		1341 (1962/63)	576	1962	46
		1342 (1963/64)	472	1963	42
		1343 (1964/65)	535	1964	33
		1344 (1965/66)	486		
		1345 (1966/67)	...[a]		

[a] keine Fälle gemeldet / no cases reported.

Tabelle IX. *Rückfallfieber in Afghanistan 1948—1959*
Zahl der in den einzelnen Monaten gemeldeten Fälle; zusammengestellt nach WHO-Berichten [513]

Table IX. *Relapsing fever in Afghanistan, 1948—1959*
Number of cases reported in each month. Compiled from WHO Reports [513]

Jahr Year	Total	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1948 [a]	60	←			26			3	7	6	5	6	7
1949	92	—	2	1	28	1	17	18	9	2	4	1	9
1950	138	6	10	10	74	18	13	2	1	—	—	4	—
1951	91	—	3	—	16	17	33	9	11	1	1	—	—
1952 [b]	18	—	—	—	2	—	2	2	2	2	7	—	1
1953 [b]	21	2	1	—	3	4	6	3	—	—	2	—	—
1954 [b]	23	—	2	1	1	1	3	5	4	5	1	—	—
1955	7	2	—	—	—	2	—	—	—	2	1	—	—
1956	6	—	1	5	—	—	—	—	—	—	—	—	—
1957 [c]	(1)												
1958	—	—	—	—	—	—	—	—	—	—	—	—	—
1959	1	—	—	—	—	—	—	—	1	—	—	—	—
Summe Total 1949—1950	397	10	19	17	124	43	74	39	28	12	16	5	10

Tabelle X. *Amöbenruhr und bakterielle Ruhr in Afghanistan 1952—1966*

Zahl der in Krankenhäusern beobachteten und gemeldeten Fälle. Angaben teilweise nach afghanischer Zeitrechnung. Zusammengestellt nach Surv. Progr. [133, 134, 134 a], Mittlg. Inst. Publ. Hlth. [386] und WHO-Bericht [520]

Table X. *Amebic and bacillary dysentery in Afghanistan, 1952—1966*

Number of cases reported from hospitals. Data given for Gregorian and Afghan calendar, respectively. Compiled fr Surv. Progr. [133, 134, 134 a], Communication Inst. Publ. Hl [386] and WHO Report [520]

Jahr Year	Zahl der Fälle in Krankenhäusern Cases reported in hospitals	
	Amöbenruhr Amebic dysentery	Bakterienruhr Bacillary dysentery
1952	1422	2620
1953	3165	4753
1954	2047	4103
1955	1802	6434
1956	2230	4054
1957	938	2218
1958	941	2059
1338 (1959/60)	343	3006
1339 (1960/61)	103	3873
1340 (1961/62)	893	7957
1341 (1962/63)	271	4313
1342 (1963/64)	421	5513
1343 (1964/65)	259	8884
1344 (1965/66)	110	2072
1345 (1966/67)	862	4243

Tabelle XI. *Pocken in Afghanistan 1949—1964*

Zahl der in den einzelnen Provinzen gemeldeten Fälle in Beziehung zur Einwohnerzahl. Zusammengestellt nach WHO-Berichten [513]

Table XI. *Smallpox in Afghanistan*

Number of cases reported in the various provinces in rel Compiled from WHO Report

Provinz Province	Einwohner Inhabitants		1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	Zahl d. Fälle Number of cases 1952—1
	in Mio.	pro km per square km																	
Badakhshan	0.4	10	.	.	.	97	89	58	7	—	—	6	—	3	8	24	14	3	309
Farah	0.3	4	.	.	.	—	35	78	14	68	31	39	26	4	29	—	32	12	368
Ghazni	0.8	27	.	.	.	159	38	2	7	2	24	12	—	10	1	6	—	—	261
Herat	1.1	9	23	80	54	13	98	93	106	11	16	69	212	21	2	11	26	24	702
Jenoubi	0.9	45	1	3	171	805	177	5	15	8	19	11	3	—	—	11	4	1	1 059
Kabul	1.3	33	85	121	705	703	85	35	49	26	11	23	38	19	34	51	27	29	1 130
Kandahar	1.1	7	14	177	55	8	11	30	52	96	34	41	10	9	9	35	202	61	598
Kataghan	0.9	30	50	81	126	99	125	171	209	315	29	52	53	—	32	63	35	5	1 188
Maimana	0.4	16	.	.	.	4	—	—	197	161	48	—	12	31	38	23	5	5	524
Mashreqi	1.1	44	93	117	135	26	55	49	30	26	1	32	38	—	2	3	27	—	289
Mazar-i-Sharif	1.0	18	127	33	53	31	61	206	123	65	4	10	38	6	8	27	120	25	724
Parwan	0.7	28	.	.	.	234	1078	1040	602	224	22	11	8	12	11	9	62	2	3 315
Summe Total	10.0	15				2179	1852	1767	1411	1002	239	306	438	115	174	263	554	167	10 467

Tabelle XII. *Influenza in Afghanistan 1952—1966*
Zahl der in Krankenhäusern beobachteten und gemeldeten Fälle. Angaben teilweise nach afghanischer Zeitrechnung. Zusammengestellt nach Surv. Progr. [133, 134, 134 a] und WHO-Berichten [523, 524]

Table XII. *Influenza in Afghanistan, 1952—1966*
Number of cases reported from hospitals. Data given for the Gregorian and Afghan calendar, respectively. Compiled from Surv. Progr. [133, 134, 134 a] and WHO Reports [523, 524]

Jahr / Year	Zahl der Fälle / Cases reported
1952	280
1953	180
1954	126
1955	445
1956	182
1335 (1956/57)	16 387
1957	7 948
1958	116
1338 (1959/60)	1 184
1339 (1960/61)	1 686
1340 (1961/62)	762
1341 (1962/63)	590
1342 (1963/64)	266
1343 (1964/65)	121
1344 (1965/66)	137
1345 (1966/67)	1 231

Tabelle XIII. *Diphtherie in verschiedenen Ländern Europas und Westasiens 1934—1938 und 1949—1953*
Jährliches Mittel der Morbidität, bezogen auf 100 000 Einwohner. Aus: KANTER [324]

Table XIII. *Diphtheria in some European and West-Asian countries, 1934—1938 and 1949—1953*
Mean annual morbidity given for 100,000 inhabitants. From: KANTER [324]

Land / Country	Mittel aus den Jahren / Means of the years 1934—1938	1949—1953
Europa / Europe		
Deutschland / Germany	20,5	63,1
Italien / Italy	69,0	32,5
Griechenland / Greece	12,0	22,2
W-Asien / West-Asia		
Türkei / Turkey	6,7	8,4 [a]
Israel	22,1	140,5
Syrien / Syria	2,1	3,2
Irak / Iraq	6,8	14,0
Iran	4,9	10,4
Turkmenistan	21,1	?
Usbekistan / Uzbekistan	18,9	?
Afghanistan	?	0,53 [b]

[a] 1950—1954 [b] 1948—1951

Tabelle XIV. *Diphtherie in Afghanistan 1948—1966*
Zahl der jährlich in Krankenhäusern beobachteten und gemeldeten Fälle und Erkrankungszahlen pro 100 000 Einwohner (bei Annahme einer Gesamtbevölkerung von 12 Millionen). Angaben teilweise in afghanischer Zeitrechnung. Zusammengestellt nach Surv. Progr. [133, 134, 134 a], Mittlg. Inst. Publ. Hlth. [386] und WHO-Berichten [519]

Table XIV. *Diphtheria in Afghanistan, 1948—1966*
Number of cases annually reported from hospitals and morbidity given for 100,000 inhabitants (assuming a total population of 12 millions). Data given for the Gregorian and Afghan calendar, respectively. Compiled from: Surv. Progr. [133, 134, 134 a], Communication Inst. Publ. Hlth. [386] and WHO Reports [519]

Jahr / Year	Zahl der gemeldeten Fälle / Cases reported	
	Absolut / Total	auf 100 000 Einw. / per 100,000 inhab.
1948	92	0,77
1949	40	0,33
1950	38	0,32
1951	89	0,74
1952	92	0,77
1953	217	1,81
1954	304	2,53
1955	299	2,49

Tabelle XV. *Keuchhusten in Afghanistan 1952—1966*
Zahl der jährlich in Krankenhäusern beobachteten und gemeldeten Fälle. Angaben teilweise in afghanischer Zeitrechnung. Zusammengestellt nach Surv. Progr. [134, 134 a] und Mittlg. Inst. Publ. Hlth. [386]

Table XV. *Whooping cough in Afghanistan, 1952—1966*
Number of cases annually reported from hospitals. Data given for Gregorian and Afghan calendar, respectively. Compiled from Surv. Progr. [133, 134, 134 a] and Communication Inst. Publ. Hlth. [386]

Jahr / Year	Zahl der Fälle / Cases reported
1952	1319
1953	2111
1954	1827
1955	1537

Literatur

Die zum *Teil A* gehörige Literatur ist im Laufe der Jahre so umfangreich geworden, daß nur die für die Darstellung unbedingt notwendigen neueren und ganz wenige grundlegende alte Arbeiten aufgeführt worden sind.

Dagegen ist für die *Teile B und C* die Literatur, soweit sie sich auf Afghanistan selbst bezieht, so vollständig wie möglich erfaßt worden. Nur die für den internen Gebrauch der WHO bestimmten Berichte, die ich in New Delhi einsehen durfte, konnten bei der Bearbeitung noch nicht berücksichtigt werden. Die dadurch an einzelnen Stellen des Textes entstandenen Lücken — z. B. Trachom- oder Tuberkulosebekämpfung — müßten evtl. später nach Veröffentlichung der Abschlußberichte durch die WHO geschlossen werden.

Die Seuchendaten sind den zitierten WHO-Zeitschriften, zumeist Wochen- oder Monatsberichten, entnommen worden. Da diese Hinweise sich teilweise auf viele Jahre beziehen, ist eine detaillierte Angabe aller Einzeldaten aus Gründen der Raumersparnis gar nicht möglich; es sind daher alle Hinweise, die sich auf die langjährige Seuchendynamik beziehen, unter einer Sammelnummer [513] zusammengefaßt worden. Wer Einzelfragen über die Entwicklung dieser oder jener Krankheit im Laufe der Jahre bearbeiten will, sollte ohnehin alle Jahrgänge der genannten Zeitschriften durcharbeiten, bekommt aber durch unsere Angabe bereits einen ersten Hinweis zum Aufsuchen der Unterlagen.

Die sehr umfangreiche epidemiologische Literatur über die *Nachbarländer* ist nur so weit berücksichtigt worden, als sie zu Vergleichszwecken unbedingt erforderlich ist.

Im übrigen seien Leser, die weitere Einzelstudien über Afghanistan und seine Anrainergebiete betreiben wollen, auf die am Schluß des Verzeichnisses angeführten Bibliographien über West- und Südwestasien verwiesen.

Abkürzungen

PM = Petermanns geogr. Mitteilungen, Gotha
TDB = Tropical Diseases Bulletin, London
WA = Welt-Seuchen-Atlas — World Atlas of Epidemic Diseases. Hrsg. von E. Rodenwaldt und H. J. Jusatz, Falk-Verlag Hamburg, Band I 1952, Band II 1956, Band III 1961.
Jb. = Jahrb. = Jahrbuch

References

Over the course of years, the literature belonging to *Part A* has proliferated to such an extent that only the most recent works, which are absolutely necessary for this presentation, together with a very few earlier but fundamental studies, have been listed.

For *Parts B and C*, however, the literature, as far as it relates to Afghanistan, has been included as comprehensively as possible. Only those reports intended for the internal use of the WHO, which I was able to peruse in New Delhi, could not as yet be considered here. The gaps which thus occur at certain points in the text — as for example, measures against trachoma or tuberculosis — may have to be filled in at a later stage after publication of the final reports by the WHO.

The data on epidemic diseases have been taken from the cited WHO periodicals — mostly weekly or monthly reports. Since some of these references relate to many years, detailed citations of all individual data are, for reasons of space limitation, quite impossible; for this reason all references concerned with the protracted dynamic of epidemic diseases have been collated under a single collective number (513). If the intention is to study particular aspects of the development of certain diseases over the course of years, all volumes of the periodicals mentioned ought, in any case, to be investigated, and our reference may already furnish the first clue for the tracing of basic source material.

The very prolific epidemiological literature on *neighbouring countries* has only been considered in so far as it was absolutely necessary for the purposes of comparison.

Apart from this, readers who are intending further individual studies on Afghanistan and its adjacent territories are invited to make use of the bibliographies on western and south-western Asia which are given at the end of the index.

Abbreviations

PM = Petermanns geogr. Mitteilungen, Gotha
TDB = Tropical Diseases Bulletin, London
WA = Welt-Seuchen-Atlas — World Atlas of Epidemic Diseases. Edited by E. Rodenwaldt and H. J. Jusatz. Publisher Falk, Hamburg, Vol. I, 1952; Vol. II, 1956; Vol. III, 1961.
Jb. = Jahrb. = Jahrbuch

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Bildbeilagen

Illustrations

Zu den Bildbeilagen

Alle Bilder, bei denen nicht ausdrücklich ein anderer Urheber genannt ist, sind nach Aufnahmen des Verfassers angefertigt worden. Einige geographische und geologische Aufnahmen, also Darstellungen heute noch unveränderter Motive, sind früheren Publikationen [32, 34, 273] entnommen; ihre Wiedergabe schien notwendig, da ein möglichst vollständiges Bild von der Vielgestaltigkeit Afghanistans vermittelt werden sollte. Die Mehrzahl der nachstehenden Bilder wurde jedoch 1964

A Note on Illustrations

If another person has not been named, all pictures are originals of the author. Some photographs, depicting unchanged geographical and geological sights have been previously published [32, 34, 273], but they are considered indispensable for a complete visual description of Afghanistan. Most of the following photographs, however, were taken during the last stay in the country, in 1964, so that the total series of pictures represents the impression Afghanistan given today — the

a)

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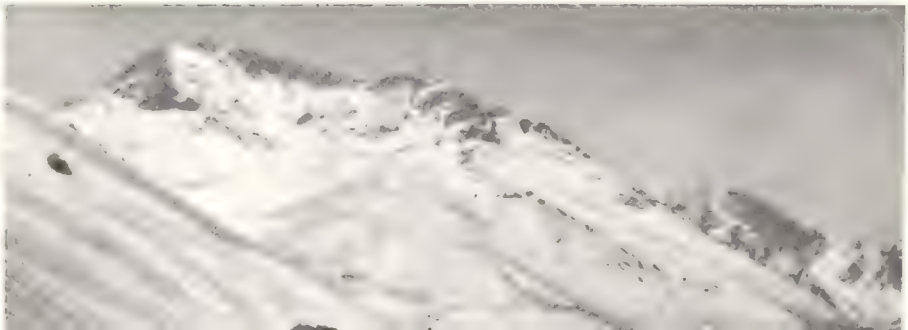

Tafel 1.

a) Hindukusch; Schlucht nördlich des Shibar-Passes mit permischen Fusulinidenkalken.
b) Tenge-Gharu bei Kabul; jungpaläozoische und mesozoische, schwach metamorphosierte Kalke und Ultrabasica.
c) Paghmangebirge bei Kabul; metamorphe Sedimente.
d) Anjuman-Paß; alte kristalline Gesteine der Hindukusch-Schwelle

b)

c)

Tafel 2.

a) Oligo-/miozäne Konglomerate mit Erdpyramiden-Bildung nördlich des Unai-Passes bei Bamian.
b) See von Bend-e-Amir; oberkretazische Steilwände, deren unterer Teil stark überschottert ist.
c) Fuladi bei Bamian; oligo-/miozäne grobklastische Gesteine wie in der Wand von Bamian.
d) Bergwand bei Doab nördlich des Hindukusch; teilweise überschotterte jurassische Saighan-Serie, überlagert von Konglomeraten der unterkretazischen Red Grit-Serie; oberste Schichten oberkretazisch

Plate 2.

a) Oligo-/miocene conglomerates with formation of earth pyramids, north of Unai Pass near Bamyan.
b) Lake of Bend-e-Amir; upper cretaceous scarps, the lower parts covered with gravel.
c) Fuladi near Bamyan; oligo-/miocene coarse clastic rocks like in the scarp of Bamyan.
d) Scarp near Doab, north of the Hindu Kush range; the upper strata of the jurassic Saighan series are partly hidden by gravel, covered by conglomerates of the lower cretaceous Red Grit series; topmost formations upper cretaceous

a)

b)

c)

Tafel 3.

a) Balkh-Fluß bei Tschischma-i-Schäfa.
b) Östlicher Logarzufluß bei Kulangar südlich von Kabul; junge plio-/pleistozäne intramontane Schotterfüllung.
c) Kunar-Fluß bei Shewa; Fährboot aus aufgeblasenen Tierhäuten.
d) Pendschir-Tal; überschottertes Paläozoikum, vorwiegend karbonatische Gesteine. Rechts unten Feldbau auf Irrigation

d)

a)

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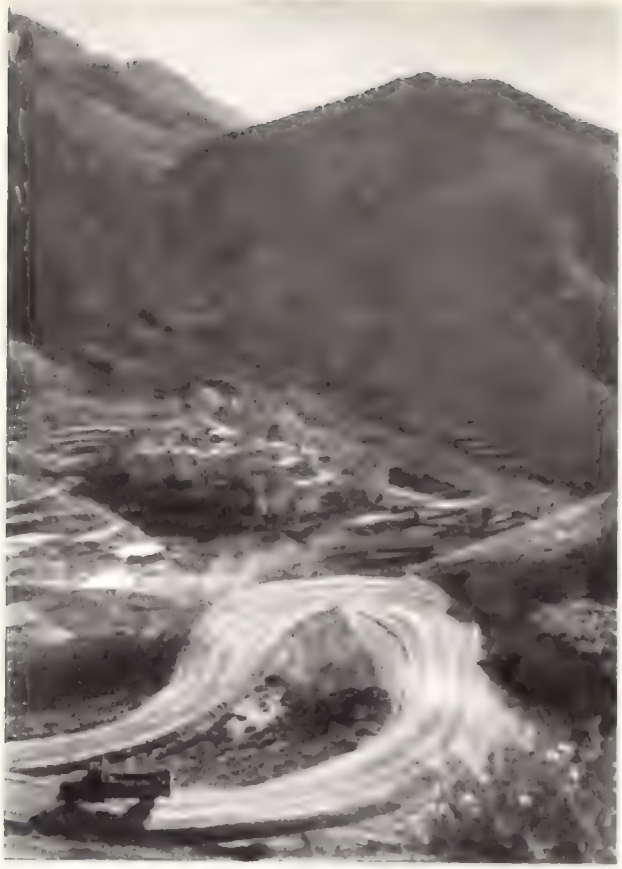
a)



b)

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Tafel 5.

a) Landstraße alter Bauart; Auffahrt zum Altimur-Paß.
b) Tenge-Gharu bei Kabul; neue Straße von Kabul nach Dschelalabad.
c) Salang-Paß; neue Straße mit Tunnelunterführung auf 3000 m.
d) Obeh bei Herat; Badehaus der Thermalquelle

d)

a)

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Tafel 6.

a) *Saccharum spontaneum* bei Grischk.
b) *Acantholimum erinaceum;* sogen. „Igelsteppe" bei Bend-e-Amir (3000 m).
c) *Callotropis procera* (Asclepiadeaceae) bei Dschelalabad.
d) *Erianthus ravennae* am Ufer des Kunduz-Flusses unterhalb von Baghlan

c)

Plate 6.

a)

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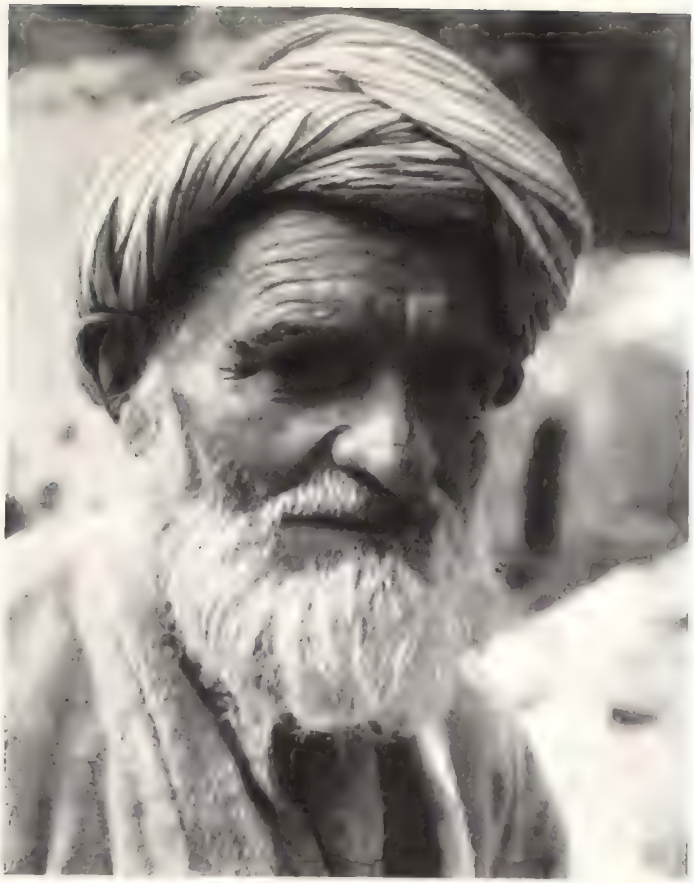
Tafel 7.

Plate 7.



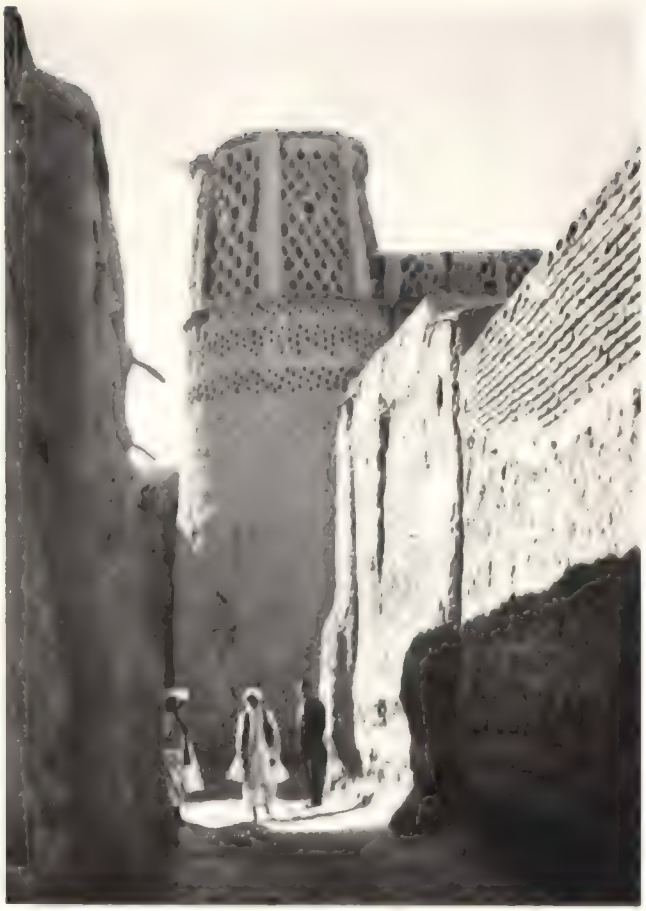
Tafel 8.

a) Junger Pathane; Ghilzai, aufgenommen bei Ghazni (M. KLIMBURG phot.).

Plate 8.

a) Young Pathan (Ghilzai) near Ghazni (M. KLIMBURG phot.).

a)



b)

c)

Tafel 9.

a) Dorfhaus im Hochgebirge; oberes Pendschir-Tal.
b) Geschlossene Dorfsiedlung; Rakhanat bei Herat, mit Taubenturm in Bildmitte.
c) Kuppelhäuser südlich von Farah; N-Grenze der Dattelpalmen.
d) Kabul; Dächer der Altstadt (Deh Afghanan)

d)

Plate 9.

a) Village house on the high mountains; upper Penjir Valley near Anjuman Pass.
b) Compact rural settlement; Rakhanat near Herat, with pigeon-tower in the centre.

a)

d)

)

)

a)

c

d

a)

d)

b)

c)

a)

b)

c)

d)

a)

b)

c)

d)

Tafel 14.

a) Institute of Public Health in Kabul.
b) Universität Kabul; neues Vorlesungsgebäude.
c) Universität Kabul; neue Bibliothek.
d) Universität Kabul; modernes Studentenwohnheim

a)

Plate 15.

a)

d)

b)

c)

ZEICHENERKLÄRUNG

Hauptstadt
Stadt über 100 000 Einwohner
Ortschaft
Hauptstraße
Nebenstraße
Gipfel, Bergspitze
Sandwüste
Flugplatz
Pass (P.)
Eisenbahn
Staatsgrenze
Waffenstillstandslinie
Flußlauf
See, Reservoir
Salzsee
Kanal
Damm

LEGEND

Capital
Town more than 100,000 inh.
Place, Settlement
Highway
Secondary road
Peak
Sand desert
Air base
Pass (P.)
Railway
Boundary
Cease-fireline
River
Lake, Reservoir
Salt lake
Canal
Dam

Maßstab · Scale 1:4 000 000

50 0 50 100 150
km

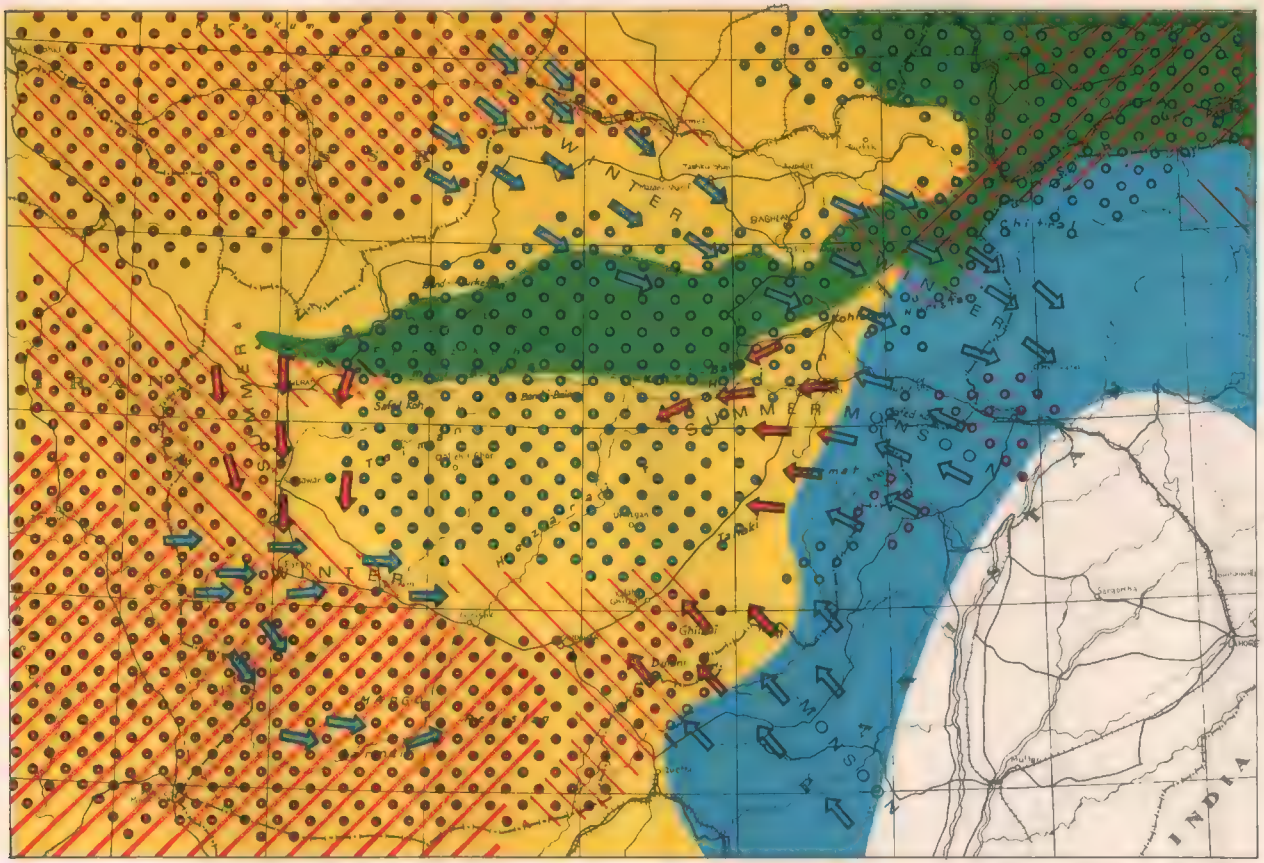
Ludolph Fischer: Afghanistan

Springer-Verlag: Berlin·Heidelberg·New York

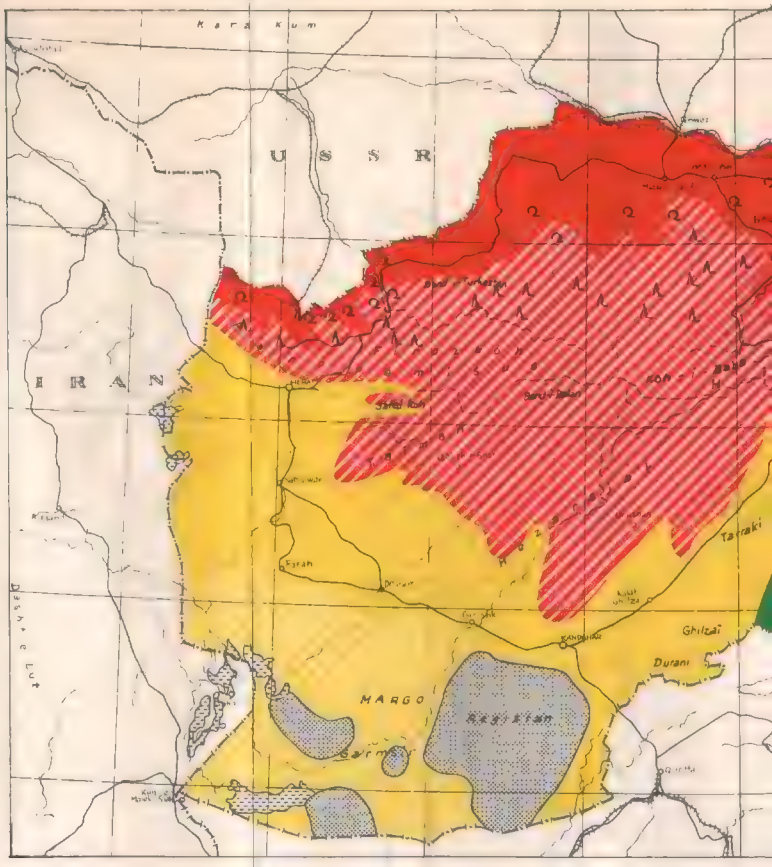
Lambert Conformal Projection Conic Standard Parallels at 32° and 36°

Klimazonen
Climatic zones

1:7500000



2a



2b

ZEICHENERKLÄRUNG

Niederschläge
(Jahreszeitliche Verteilung)

- Nur Winter- und Frühjahrsniederschläge
- Zusätzliche Sommerregen (Monsuneinflüsse)
- Ganzjährige Niederschläge

Trockenregionen

- Semiaride Gebiete (Niederschläge 100-250 mm jährlich)
- Aride Gebiete (Niederschläge unter 100 mm jährlich)

Winde

- Trockene Winde
- Regenführende Winde

Extreme Klimaregionen

- Garmsir = Heisse Region (mit milden Wintern)
- Zardsir = Kalte Region (mit zwei- oder mehrmonatigem Schneefall)

Nach O. H. VOLK
aus: Atlas for Secondary Schools in Afghanistan,
Karl Wenschow G.m.b.H. München (geändert)

LEGEND

Precipitation
(Seasonal distribution)

- Winter and Spring only
- Additional rains in summer (Monsoon)
- During the whole year

Dry regions

- Moderately dry
  Annually Precipitation 100-250 mm
- Extremely dry
  Annually Precipitation below 100 mm

Winds

- Dry winds
- Rain bearing winds

Regions of extreme climates

- Garmsir = hot regions (Winters mostly mild)
- Zardsir = cool regions (2 months or more with snow)

ZEICHENERKLÄRUNG

- Südturkestanische Steppenregion mit kurzlebiger Vegetation
- Hochgebirgssteppe
- Hochgebirgs-Halbwüstenregion (pamiro-altaisch)
- Zentrale Steppen- und Halbwüstenregion
- Südliche Halbwüsten- und Wüstenregion
- Unter Monsuneinfluß stehende paläotrope Steppen und xerophile Waldungen
- Cedrus deodora- oder Pinus-Hochwaldregion der Monsunzone
- Sandgebiete
- Seen, Sumpfgebiete
- Salzebenen
- Gehölzfluren mit Pistacia vera
- Gehölzfluren mit Baumwacholdern (Juniperus seravschanica)

According to O. H. VOLK
from: Atlas for Secondary Schools in Afghanistan,
by Karl Wenschow G.m.b.H. München (changed)

len der Provinzen und Städte, f volle Tausender

i

er; ländliche Bevölkerung
er; städtische Bevölkerung
er; städtische Bevölkerung

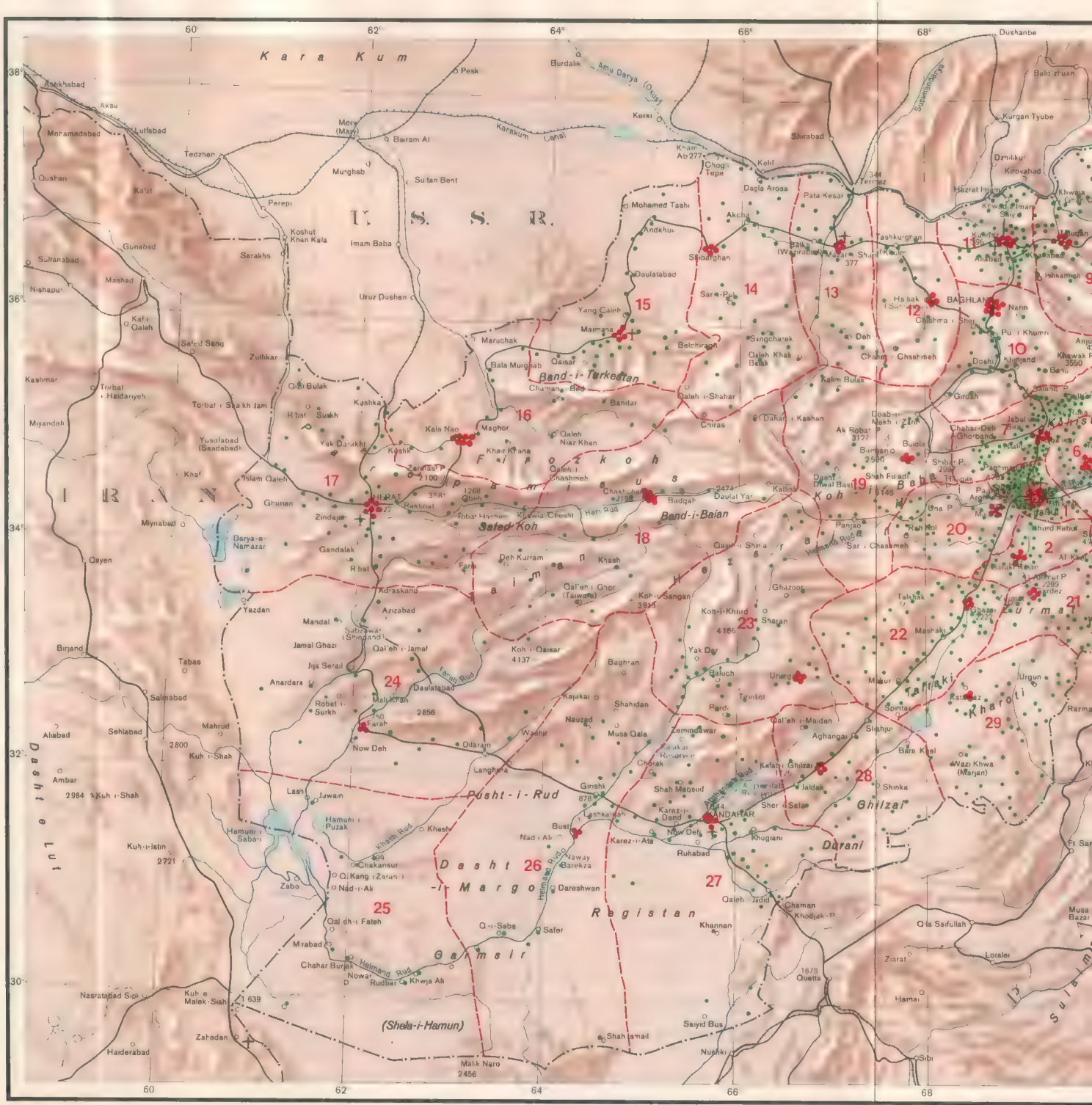
HAHN (50a), HUMLUM (60), REINER (114a) und der afghanischen Be-
966/67.

habitants in the provinces and towns, full thousands

ts; rural population
ts; urban population
ts; urban population

50a), HUMLUM (60), REINER (114a) and the Afghan census of 1966/67.

ovinzen siehe Kartenrückseite / Census of provinces see back of this map



Lambert Conformal Projection Conic Standard Parallels at 32° and 36°

Maßstab · Scale 1 : 4 000 000
50 0 50 100 150
km

ser und andere Abteilungen des ärztlichen Afghanistan

1968) Mehrere an einem Ort befindliche gleichartige Einrichtungen sind aus rsparnis jeweils nur einmal verzeichnet worden (Vergl. Tab. V)

ING

enhaus bzw. Männerabteilung eines Stadtkrankenhauses

enhaus bzw. Frauen-Abteilung eines Stadtkrankenhauses

aus

rankenhaus für Männer

Krankenhaus für Frauen

prechstunde

lung

Station

Abteilung

ulanz

ten Halbmondes

ach Survey of Progress (133, 134, 134a), Mittlg. Min. Publ. Hlth. (386) und Stat.

d other medical wards in Afghanistan

8) To save space, places with several institutions of the same kind are denoted respective symbols (cf. Table V)

en or men's ward of an urban hospital

omen or women's ward of an urban hospital

ospital for men

ospital for women

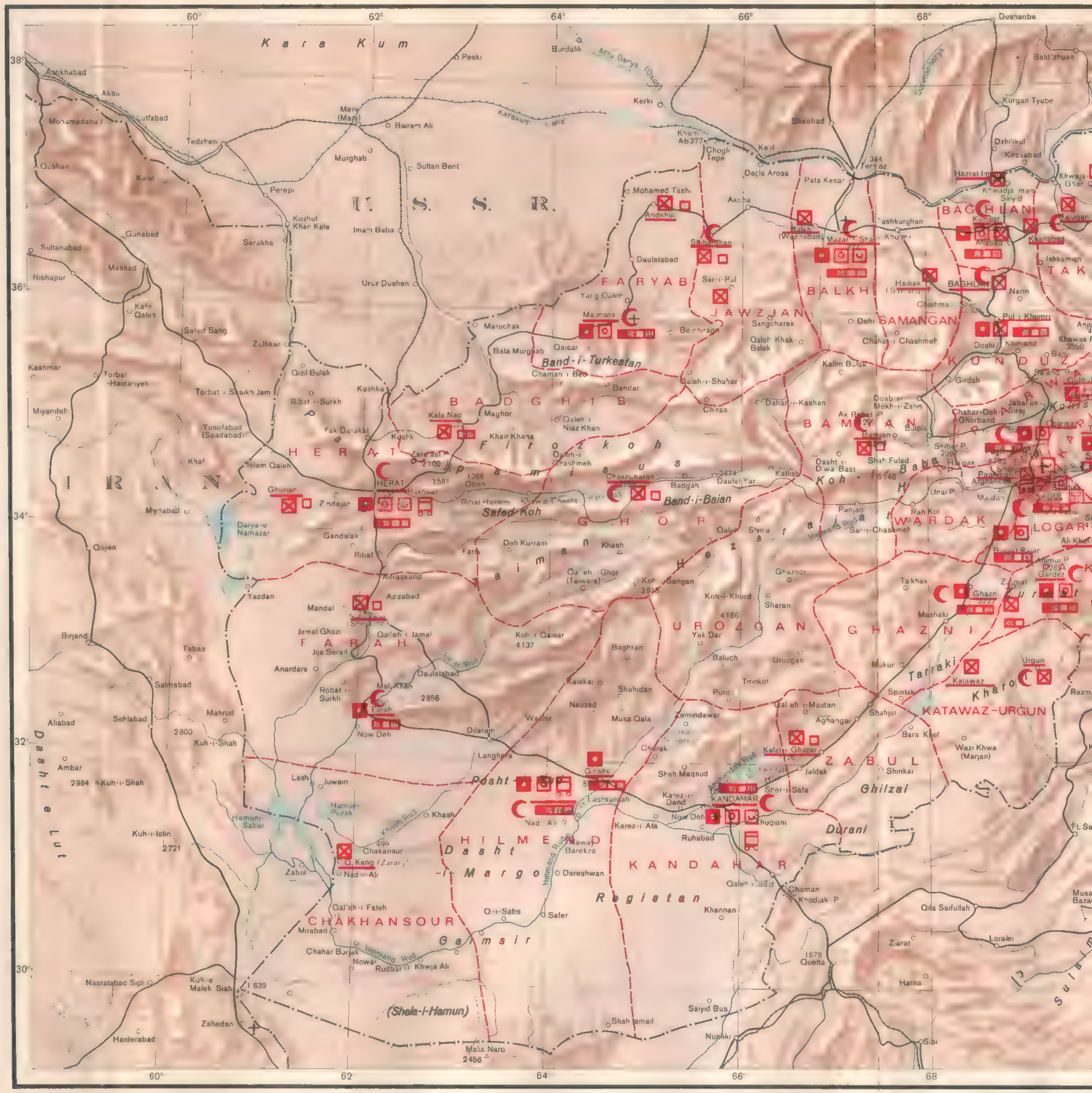
pital

ital

ance

station

ey of Progress (133, 134, 134a), Comm. Min. Publ. Hlth. (386) and Stat. Rep. Min.



Lambert Conformal Projection Conic Standard Parallels at 32° and 36°

Maßstab · Scale 1 : 4 000 000

50 0 50 100 150 km

er Malaria in Afghanistan
r Bekämpfung

d Siedlungsgebiete unter 2000 m waren befallen; nur die darüber gelegenen
einzelnen Wüsten- und Steppengebiete galten als malariafrei.

G

nische Zonen

nische Zonen

mische Zonen

l.

ch DHIR u. RAHIM (245), DY (252), FISCHER u. STEINHART (273),
(441) und Beobachtungen des Afghanischen Malaria-Institutes.

f malaria in Afghanistan
mpaign

nd settled areas below 2,000 m (6,500 feet) were malarious; only the mountain
des and some of the desert and steppe areas were considered free of malaria

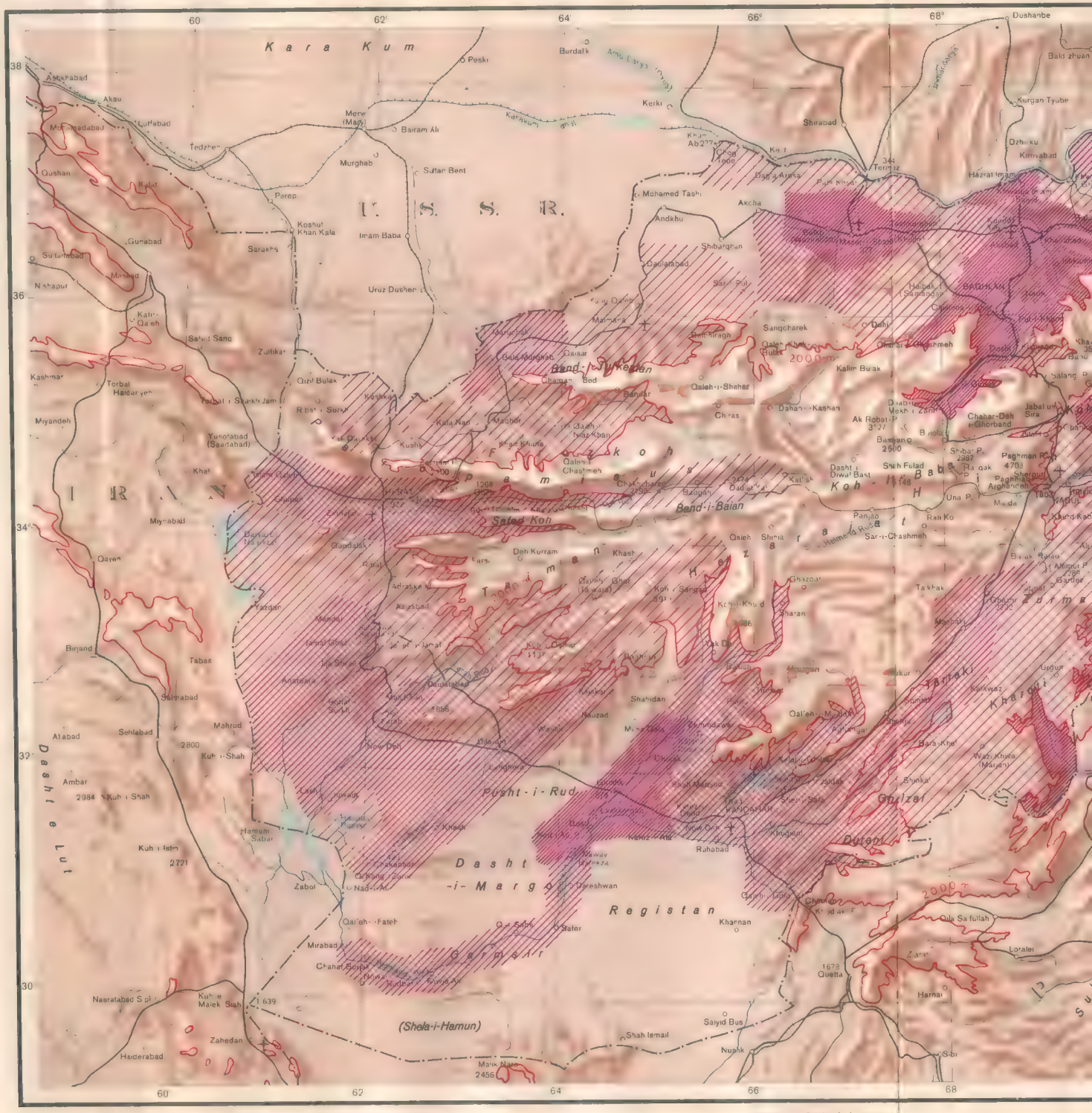
nic areas

nic areas

mic areas

ve sea level

a. RAHIM (245), DY (252), FISCHER a. STEINHART (273), IYENGAR (313),
ous assessment by the Afghan Institute of Malariology.



Lambert Conformal Projection Conic Standard Parallels at 32° and 36°

Maßstab · Scale 1:4 000 000

50 0 50 100 150

km

ghanistan, wichtigste Funde in den Anrainer-Gebieten und Malaria-Stationen

ndstellen (Eintragung unter einem Ortsnamen bezeichnet Vorkommen der genann-
er weiteren Umgebung)

als Überträger erwiesene Arten

hen den Ausbreitungsgebieten der paläarktischen und indischen bzw. orientalisch-
n in Afghanistan

t

alaria-Zentrum

t

IR u. RAHIM (245), FISCHER u. STEINHART (273), IYENGAR (313),
chtungen des afghanischen Malaria-Institutes

**heline mosquitoes in Afghanistan, the most important habitats
nd stations of the Afghan Malaria Service**

s of Anopheline mosquitoes (The data given for a locality actually refer to surround-

gnized as vectors of malaria in Afghanistan

tween habitats of palaearctic and Indian or Indian-oriental species

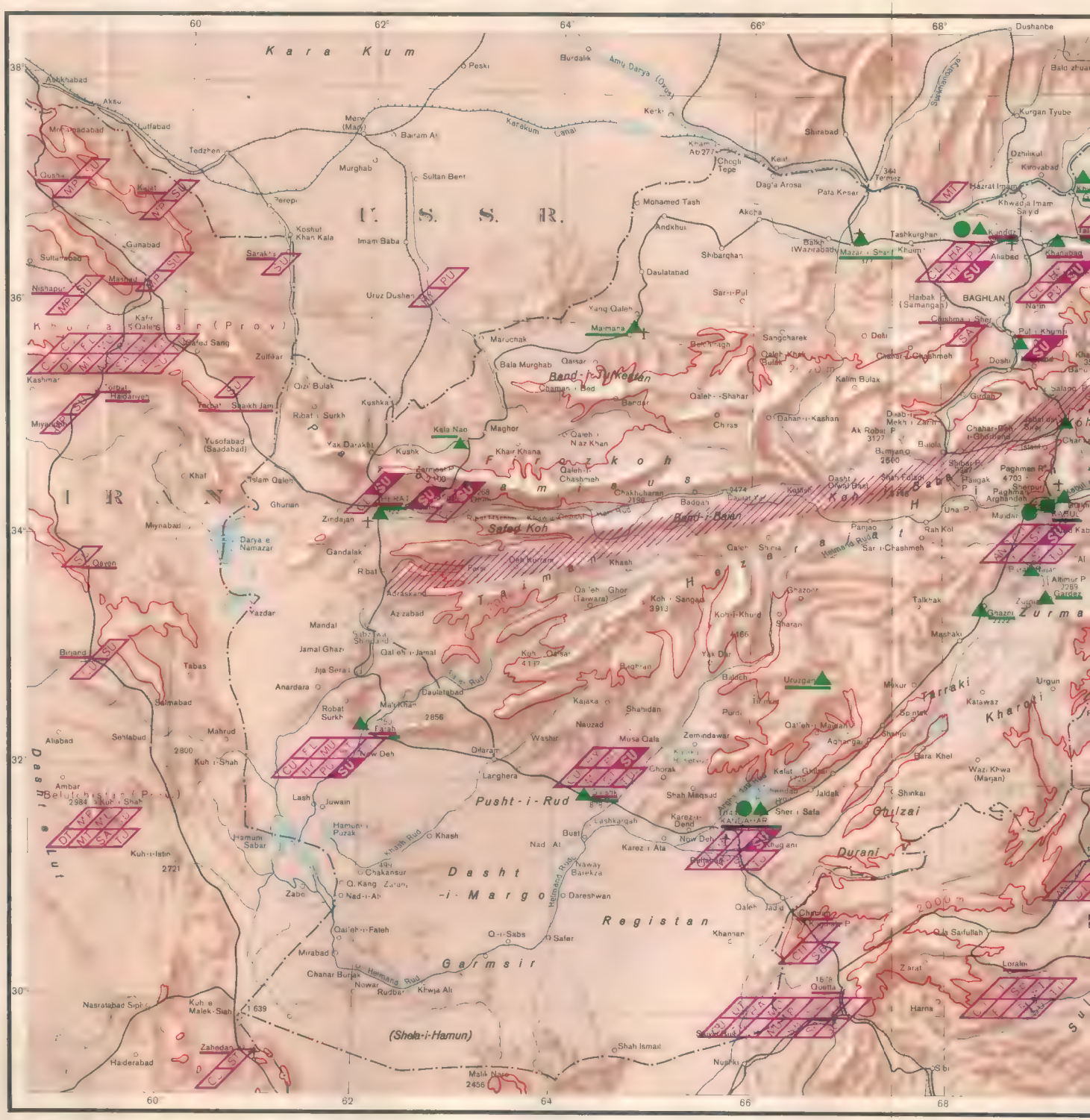
lariology

dquarter

HIM (245), FISCHER a. STEINHART (273), IYENGAR (313), RAO (441)
t by the Afghan Institute of Malariology

**südl. des Hindukusch bzw. der Zentralgebirge
uth of the Hindu-Kush or the Central Range**

	in Afghanistan	in Nachbar-gebieten in adjacent terntories
rctic species		
ger	N	N
ulipennis	---	N+S
pes (plumbeus)	---	N+(S)
arovi	N	N+(S)
anean species		
li	---	S
pi	(N)	S
eri (sogdianus)	---	N+S
color	S	S
berrimus	N+S	N+S
enti	---	S
rpictus	N+S	N+S
sche Art/Mediterranean-Oriental-Indian species		
anus	N+S	N+S
dische Arten/Oriental-Indian and Indian species		
laris	S	S
iaces	S	S
tibis	S	S
atus	S	S
hulensis	S	S
dus	---	S
ndidus	S	S
nensi	S	S
ictus	S	S
udi	S	S
s	S	S
riental-Alpine species		
s	---	S
sayi	---	N+S



Lambert Conformal Projection Conic Standard Parallels at 32° and 36°

Maßstab · Scale 1 : 4 000 000

50 0 50 100 150
km

kfieber in Afghanistan 1948-1953

zen; die in Farah beobachteten Fälle
ar verzeichnet.

ÄRUNG

er gesamten Berichtszeit:
f 100000 Einwohner:

unter 10,0

10,1 - 25,0

25,1 - 50,0

50,1 - 100,0

mehr als 100,0

Mittlere Befallsrate der Provinz 1948-53.

Zahl der Fälle in einzelnen Jahren

lt nach HUMLUM (60) und WHO-Berichten (513)

ne typhus in Afghanistan, 1948-1953

rs as they existed in 1948; cases in the Province Farah are included in the data
har.

n during the whole period;
0 inhabitants:

less than 10.0

10.1 - 25.0

25.1 - 50.0

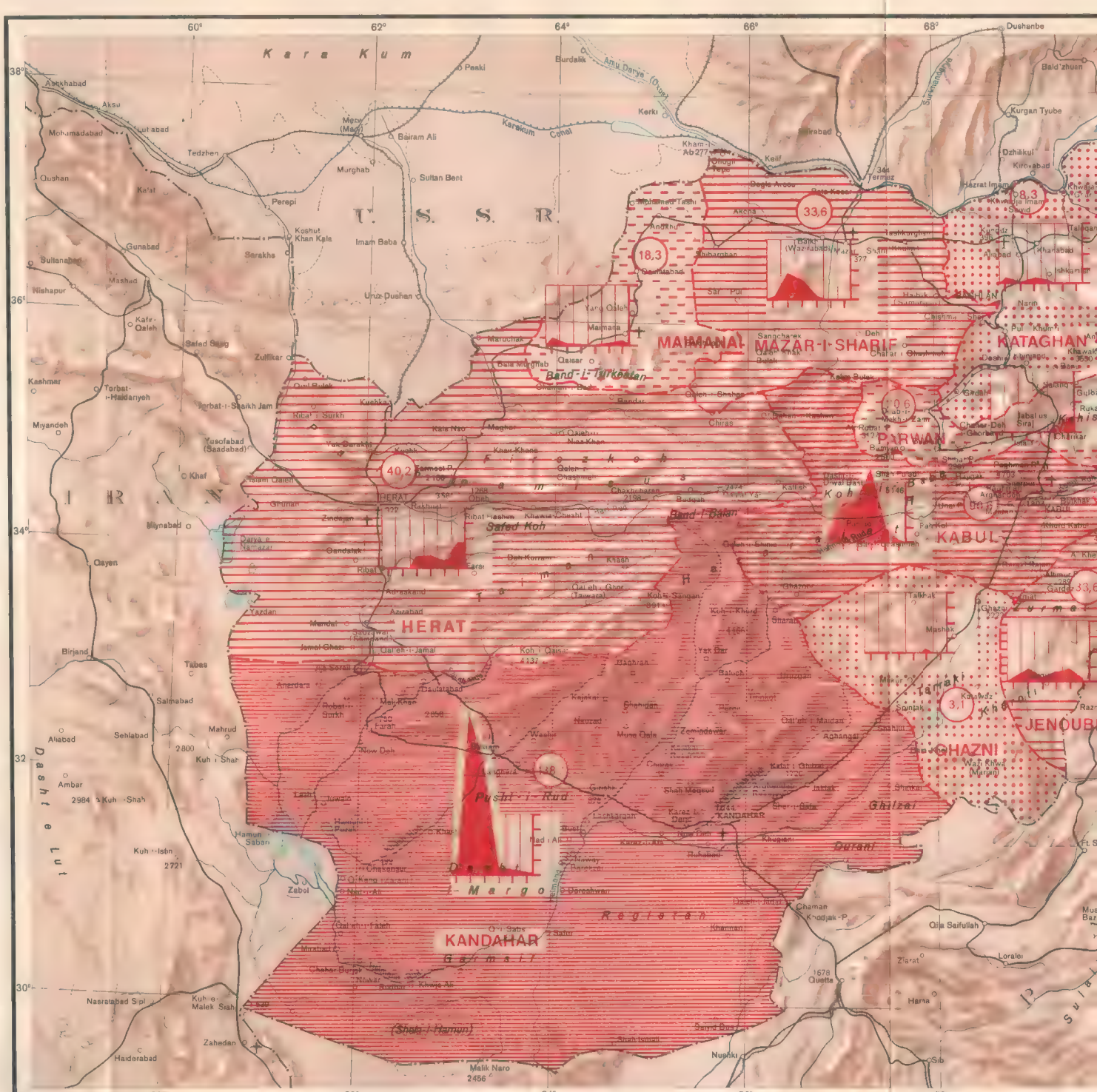
50.1 - 100.0

more than 100.0

Mean rate of infection in the province, 1948-53.

Cases annually reported

UMLUM (60) and WHO Reports (513)



Lambert Conformal Projection Conic Standard Parallels at 32° and 36°

Maßstab · Scale 1:4 000 000
50 0 50 100 150
km

ieber in Afghanistan 1954-1964

Zeit von 1948-1953 im ganzen Land starker Rückgang der Krankheitsfrequenz; ist nach den vorliegenden Meldungen Afghanistan praktisch fleckfieberfrei. Die heint nunmehr mit eigenen Meldungen.

RUNG

Zahl der Fälle in den einzelnen Jahren

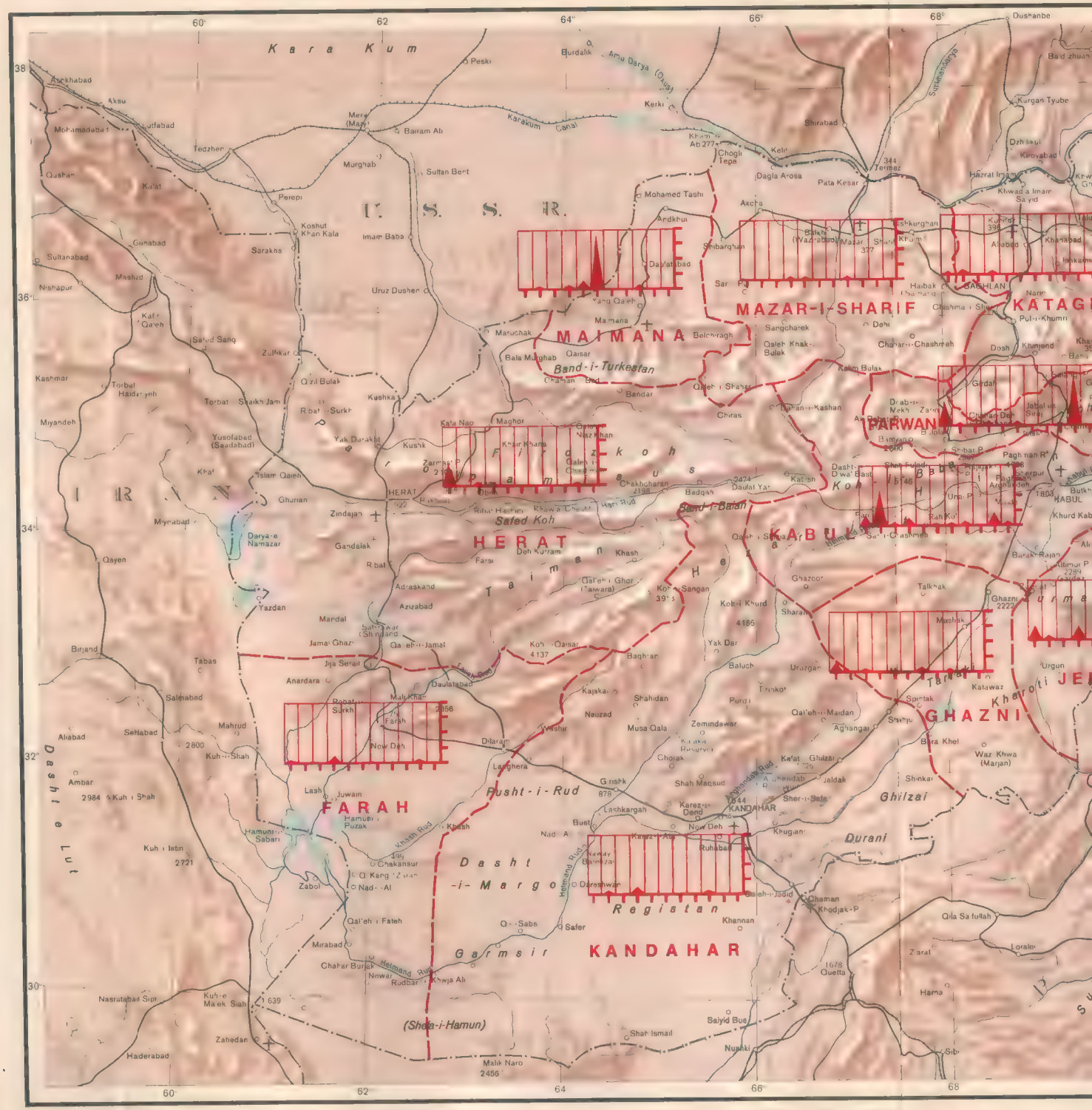
nach HUMLUM (60) und WHO-Berichten (513)

e typhus in Afghanistan, 1954-1964

years 1948-1953, the incidence rate of the disease has markedly declined so al point of view, Afghanistan seems to be rid of typhus in this decade. appears as a seperate province.

Number of cases annually reported in the province

UMLUM (60) and WHO Reports (513)



Lambert Conformal Projection Conic Standard Parallels at 32° and 36°

anistan 1930-1965

anderseuche den Verkehrswegen, ist aber im Lande nicht endemisch.

Ausbruch (Monat) — Weg der Verbreitung — Mutmaßlicher Weg der Verbreitung — Verbreitung durch Karawanen

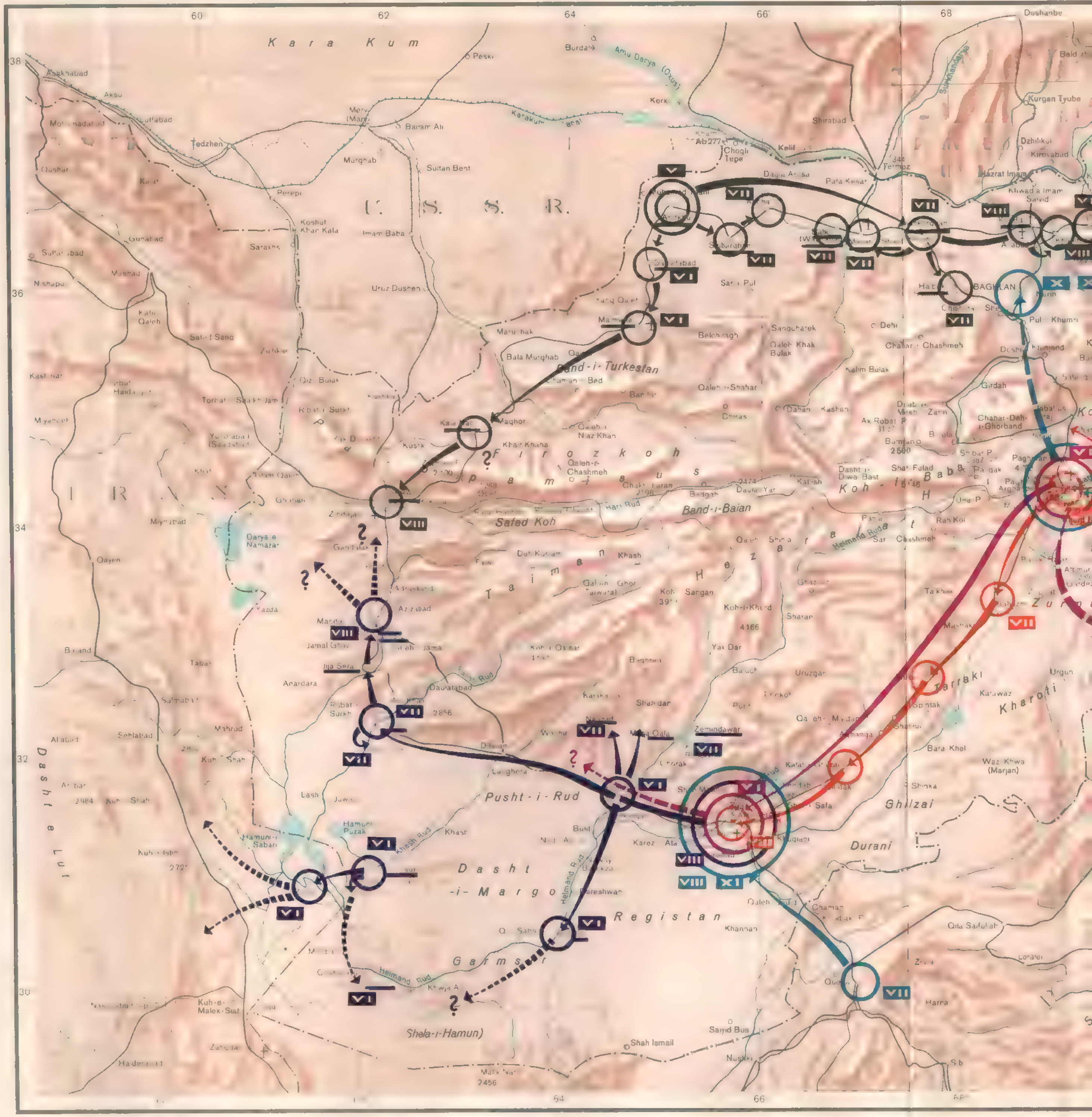
BOU-GAREEB (160), Off. Internat. d' Hyg. Publ. (220) und WHO-Berichten (513)

anistan, 1930-1965

ic in the country; as a „migrating epidemic" cholera follows the traffic

Outbreak (Month) — Route of expansion — Presumable route of expansion — Spreading by caravans

REEB (160), Off. Internat. d' Hyg. Publ. (220) and WHO Reports (513)



Lambert Conformal Projection Conic Standard Parallels at 32° and 36°

Maßstab · Scale 1 : 4 000 000
50 0 50 100 150
km

Pockenerkrankungen in Afghanistan 1952-1964
acher Befall in den meisten Provinzen

RKLÄRUNG

Absolute Zahl der jährlich gemeldeten Fälle in den einzelnen Provinzen; wenn in einem Jahr mehr als 40 Erkrankungsfälle in einer Provinz gemeldet wurden, sind 2 oder mehr Säulen mit engem Abstand nebeneinander gestellt worden; die Abstände zwischen den einzelnen Jahren sind breiter gehalten.

Mittlere Befallsdichte auf 100000 Einwohner:

0 - 2,5

2,6 - 5,0

5,1 - 10,0

mehr als 10,0

Mittlere Dichte des jährlichen Befalls pro 100000 Einwohner in der Provinz (alte Provinzeinteilung)

gestellt nach HUMLUM (60) und WHO-Berichten (513)

smallpox in Afghanistan, 1952-1964
vinces the rate of infection was rather low

Absolute number of cases reported in each year in each province. If more than 40 cases were reported for one province within one year, this has been denoted by two or more columns set close together. Larger intervals indicate another year.

Mean rate of infection per 100,000 inhabitants:

0 2.5

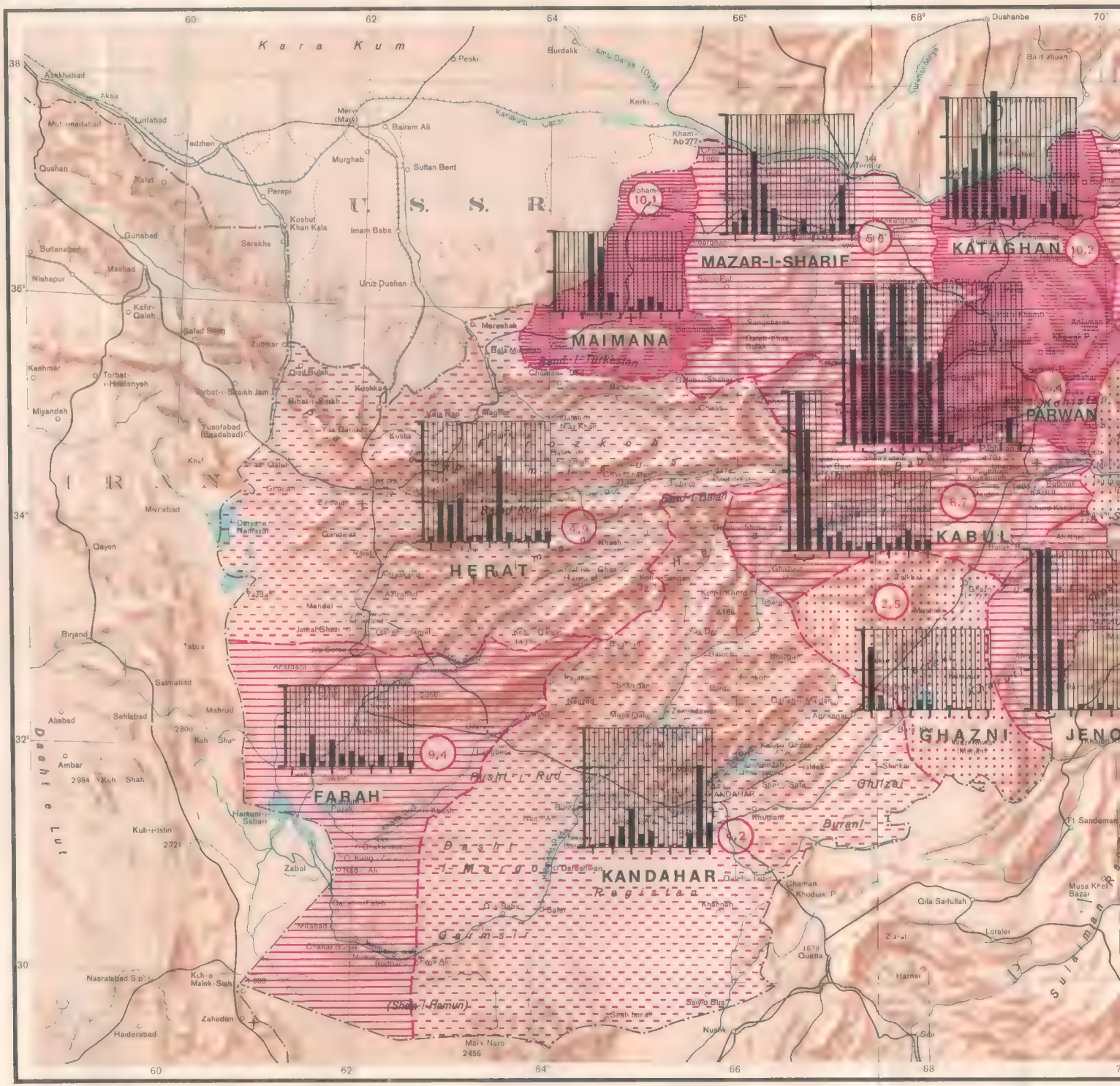
2.6 - 5.0

5.1 - 10.0

more than 10.0

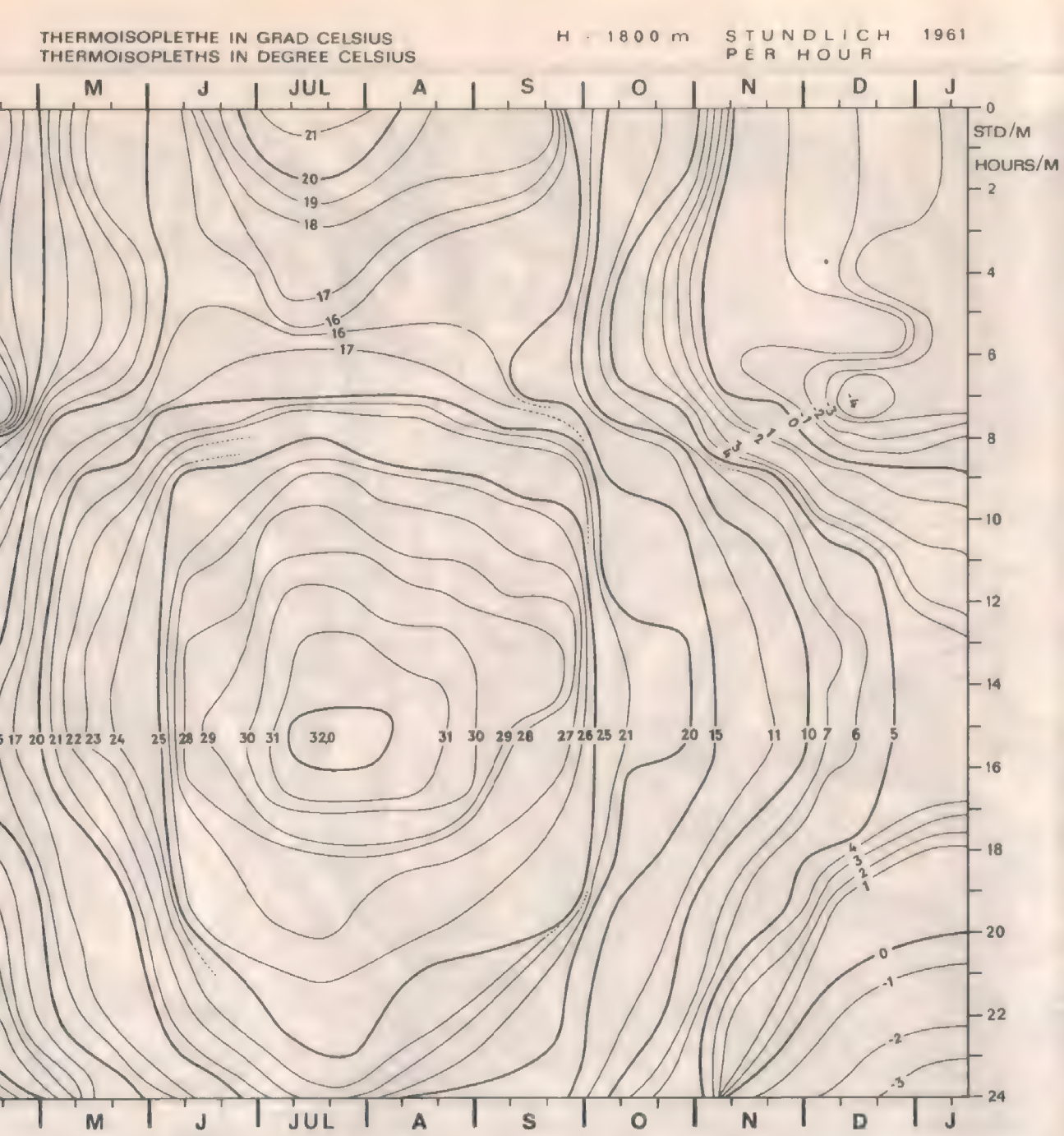
Mean annual rate of infection per 100,000 inhabitants in the province (former province boundaries)

rom HUMLUM (60) and WHO Reports (513)



Lambert Conformal Projection Conic Standard Parallels at 32° and 36°

Maßstab · Scale 1 : 4 000 000
50 0 50 100 150
km



n für Kabul 1961

Fig. 2 **Thermoisopleths of Kabul 1961**

According to E. REINER (114)

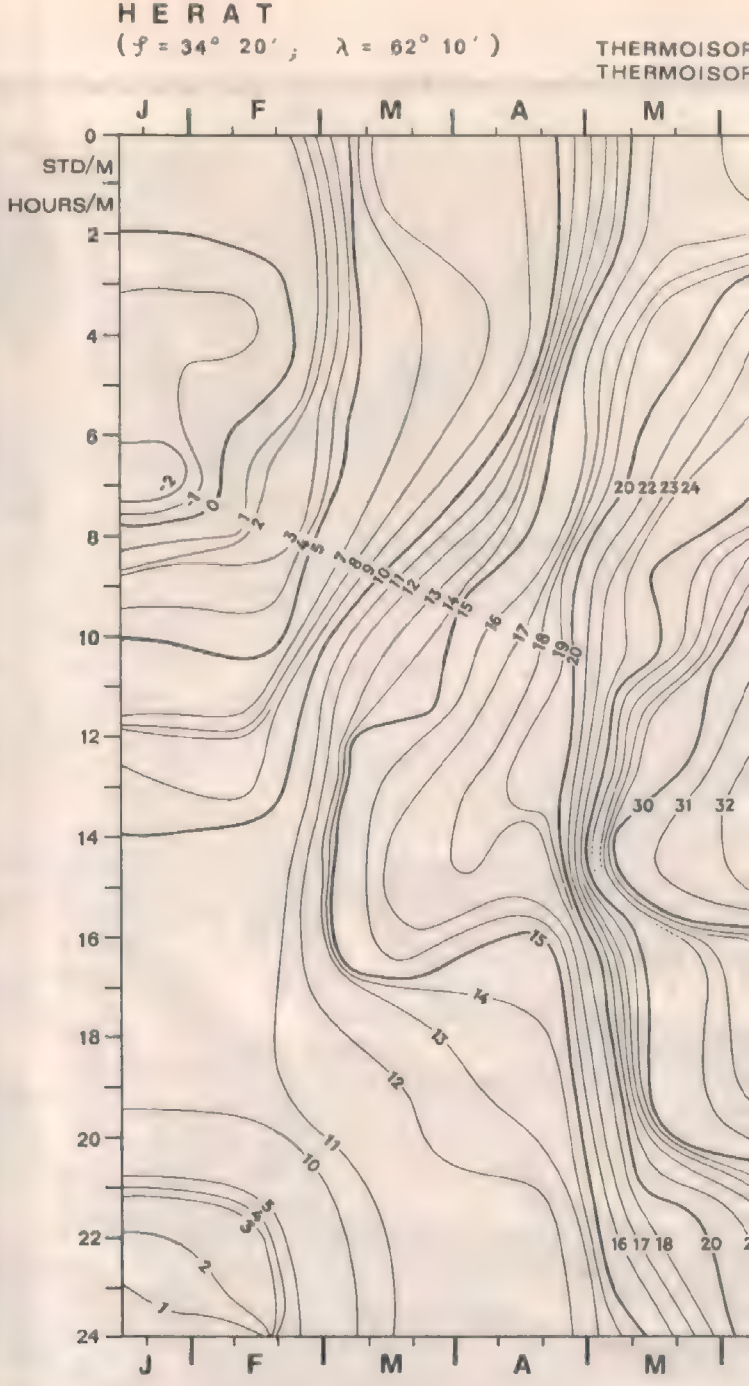
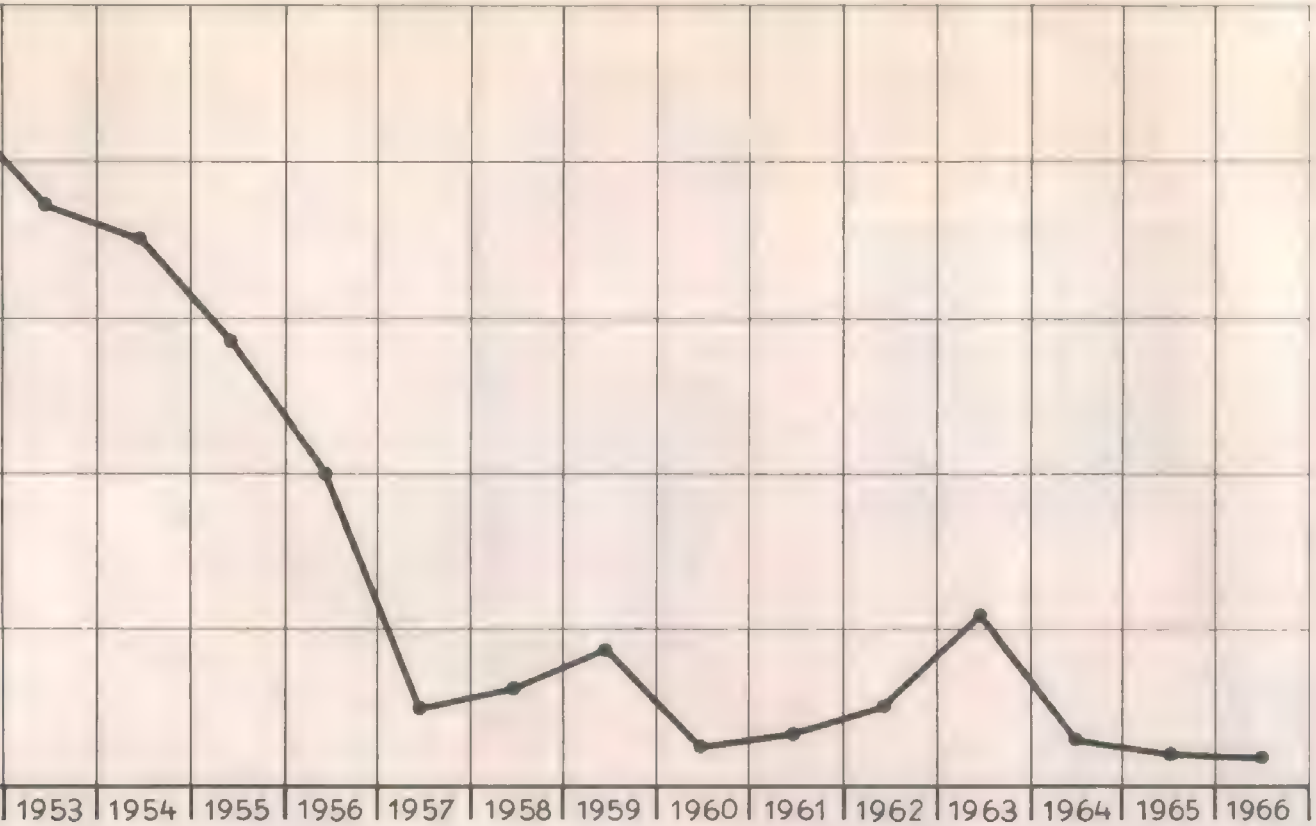


Abb. 3 **Thermoisoplethen für Hera**

Nach E. REINER (114)



istan 1949-1966

lnen Jahren gemeldeten Fälle
auf 100,000 Einwohner (bei An-
ahl von 12 Millionen).

O-Berichten (513)

Fig. 13

Smallpox in Afghanistan, 1949-1966

Number of cases reported for the single years and morbidity per 100000 inhabitants (assuming a population of 12 millions).

Compiled from WHO Reports (513)

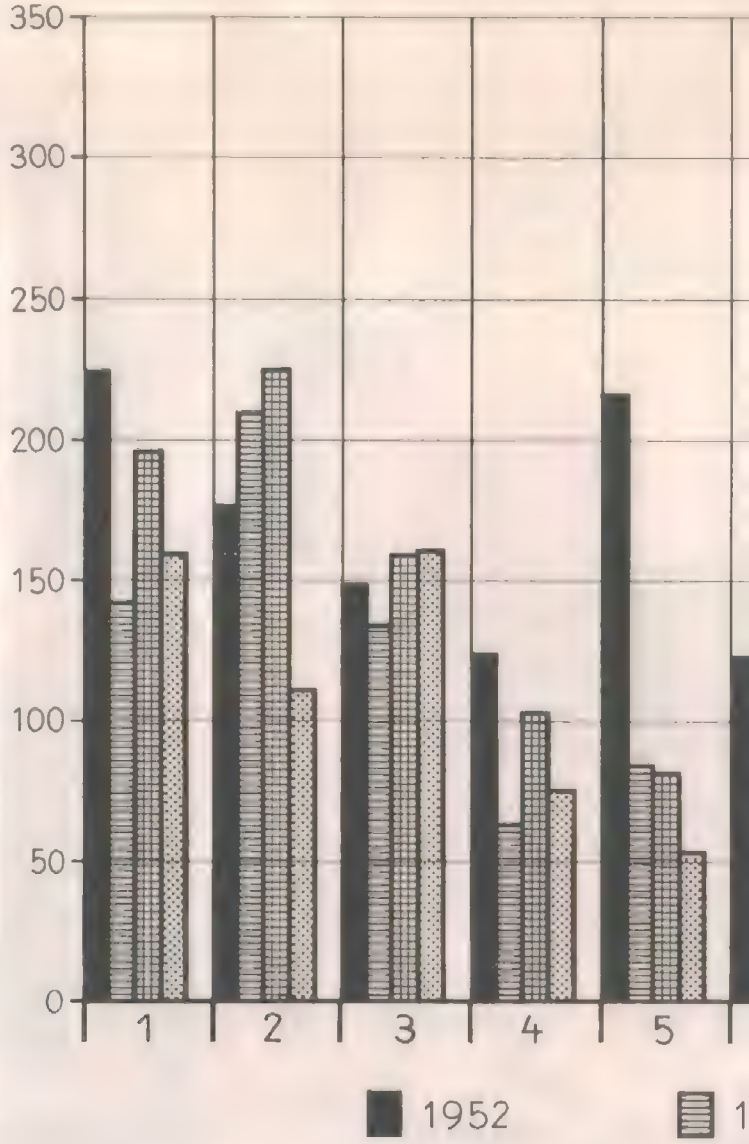


Abb. 14

Pockenhäufigkeit in Abhängigk von der Jahreszeit

Zahl der in den vierwöchigen Perioden gemeldeten von 1952-1955

Zusammengestellt nach WHO-Berichten (513)

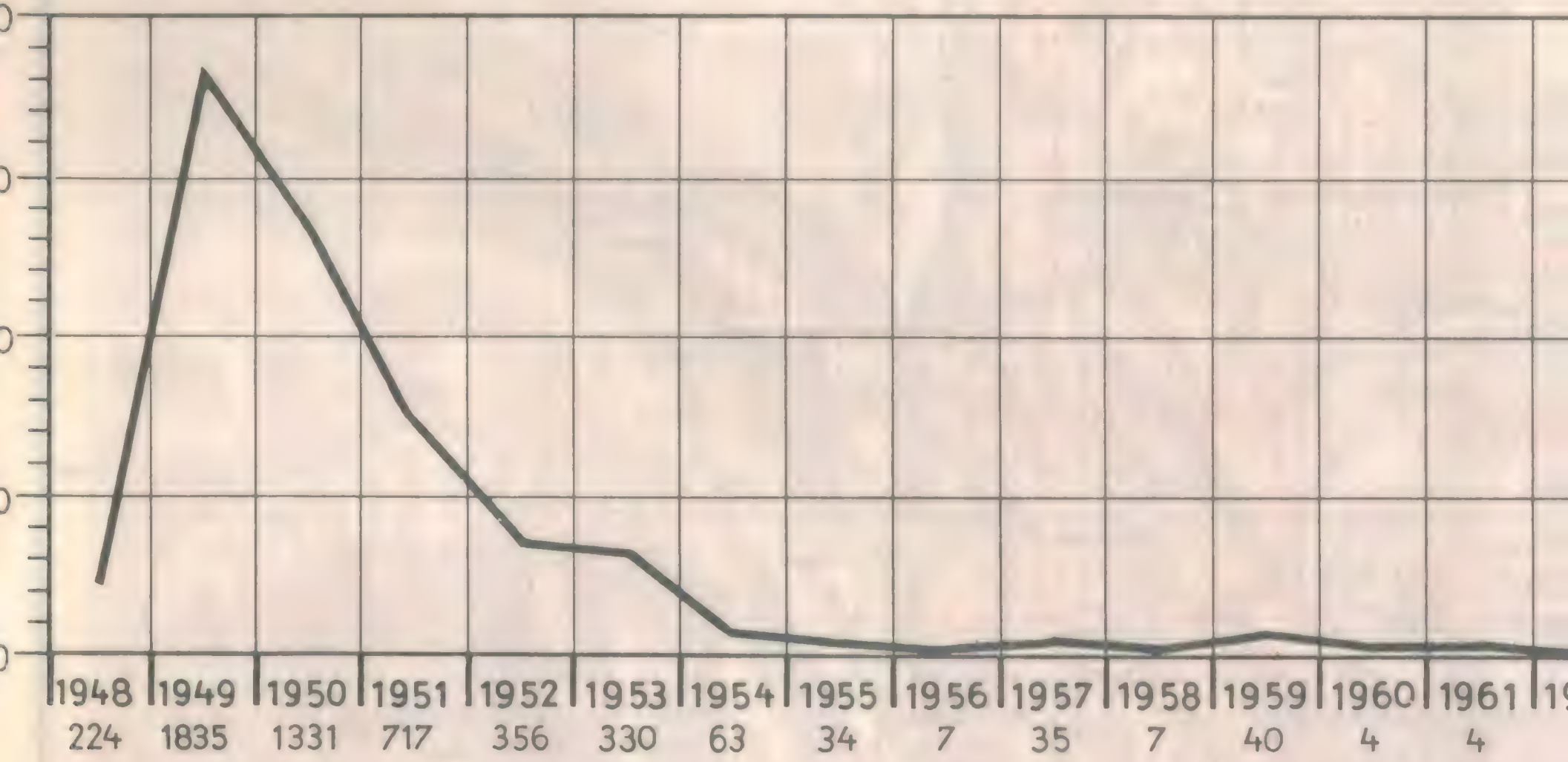


Abb. 9

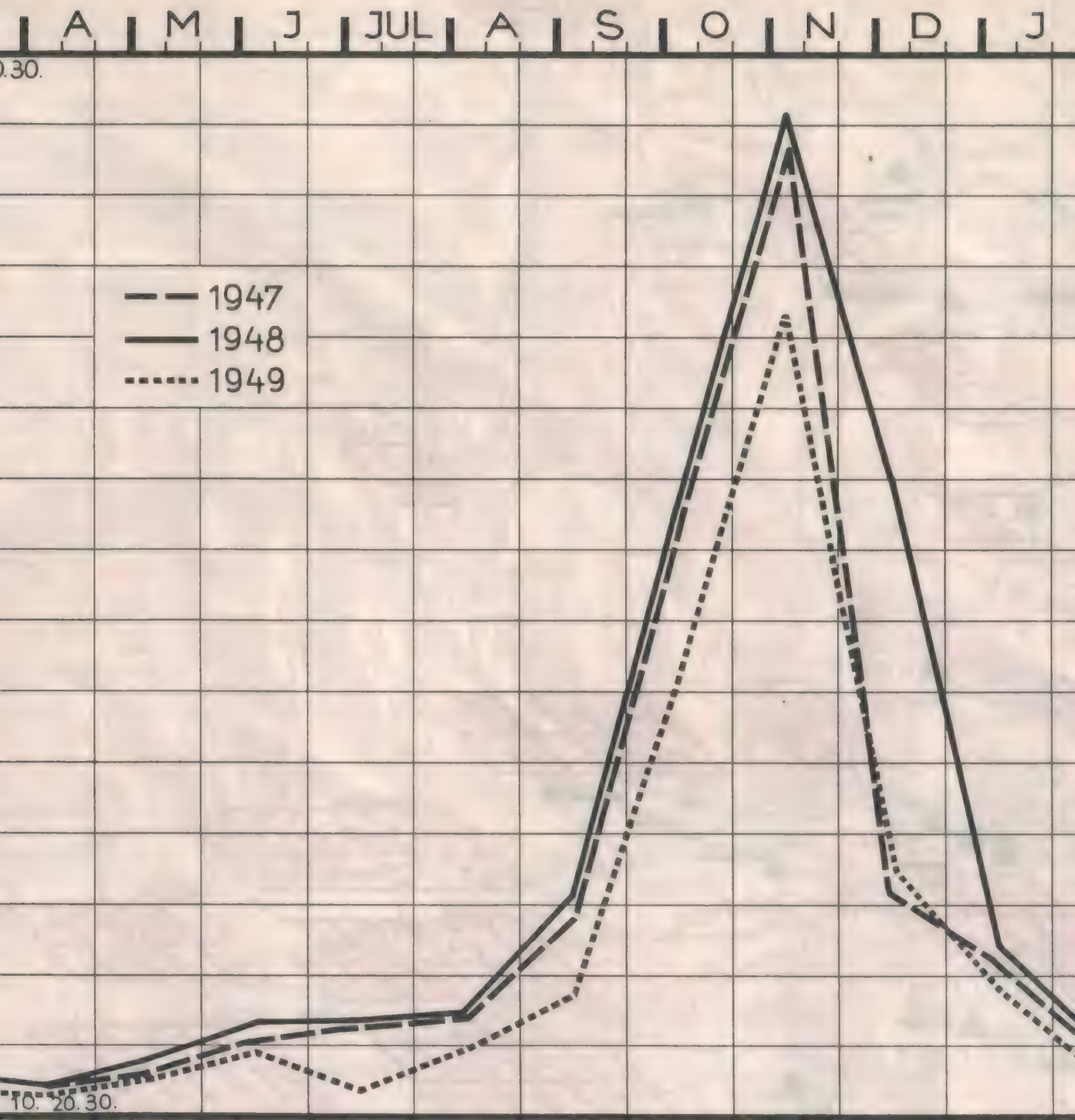
Fleckfieberhäufigkeit in Afghanistan 1948-1964

Absolute Zahl der gemeldeten Fälle. Zusammengestellt nach WHO-Berichten (513)

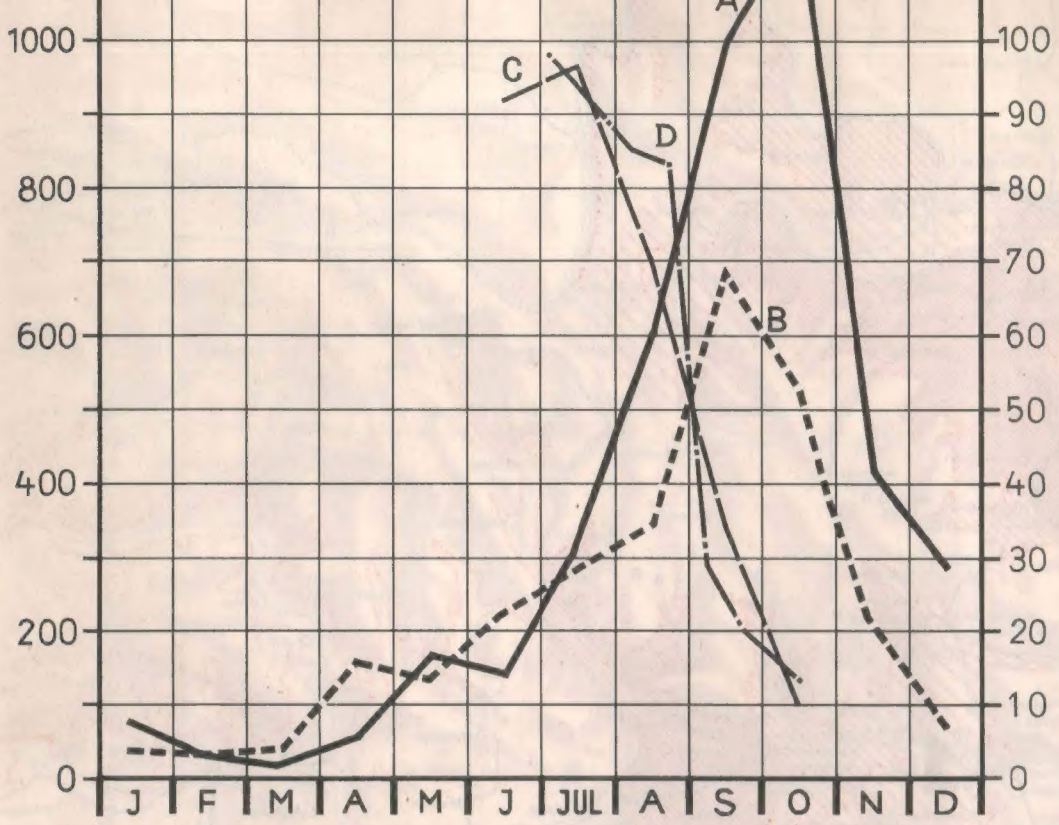
Fig. 9

Occurrence of typhus in Afghanistan,

Number of reported cases. Compiled from



HAMAL	SAUR	JAWZA	SARATAN	ASAD	SOMBOLA	MIZAN	AKRAB	KAUS	JADDI
98	130	216	260	287	560	1700	2740	630	430
85	160	260	275	299	624	1740	2821	1780	480



	J	F	M	A	M	J	JUL	A	S	O	N	D	
A:1939	86	30	19	49	158	143	310	604	987	1160	409	292	FÄLLE
B:1951	45	32	33	162	145	227	287	349	684	530	206	75	CASES

Abb. 6

Malaria in Kabul 1939 und 1951

in Beziehung zur Frequenz von Anopheles superpictus GRASSI. Zusammengestellt nach FISCHER et al. (271), FISCHER u. STEINHART (273) und IYENGAR (313)

A. Zahl der Malariafälle in Städtischen Poliklinik en 1939

B. Zahl der Malariafälle in Städtischer Poliklinik 1951

C. Anteil an A. superpictus-Larven in den Sommermonaten in Prozenten aller gefangenen Larven (IYENGAR):

Juni	92%
Juli	97%
August	70%
September	34%
Oktober	10%

D. Anteil an A. superpictus-Imagines in Häusern von Kabul, gleichfalls in Prozenten der Gesamtfänge (IYENGAR):

Juli	1.-15.	98.5%
	16.-31.	90.0%
August	1.-15.	85.2%

Fig. 6

Malaria in Kabul,1939 and 1951

in relation to the occurrence of Anopheles superpictus GRASSI. Compiled from FISCHER et al. (271), FISCHER a. STEINHART (273) and IYENGAR (313)

A. Malaria cases in the municipal outpatients hospitals, 1939.

B. Malaria cases in the municipal outpatients hospital, 1951.

C. Percentage of A. superpictus larvae in the collections (IYENGAR):

June	92%
July	97%
August	70%
September	34%
October	10%

D. Percentage of adult A. superpictus collected in houses of Kabul (IYENGAR):

July	1.-15.	98.5%
	16.-31.	90.0%
August	1.-15.	85.2%

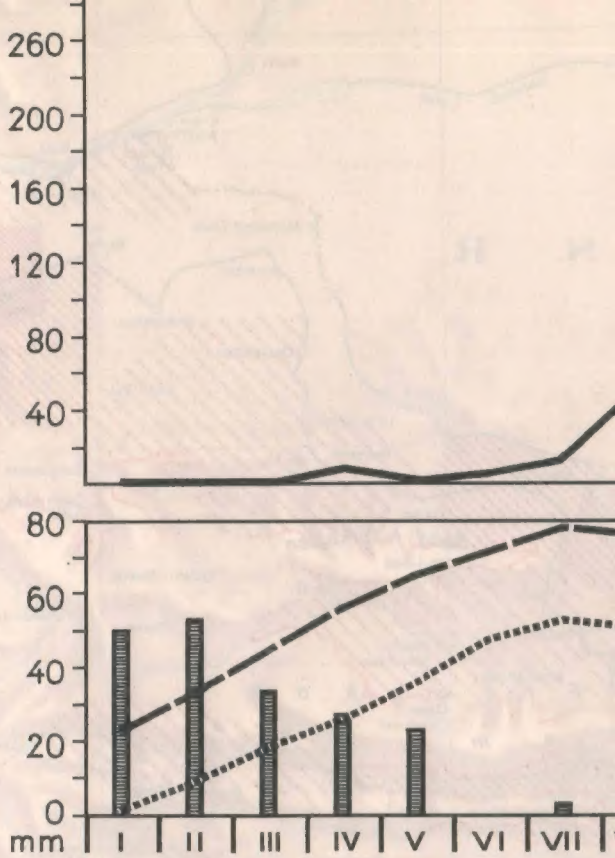


Abb. 7

Malaria in Sarobi 1952/53

Nach FISCHER u. STEINHART (273)

1 — Zahl der Malariafälle in den einzelnen Monaten

2 — Mittleres Maximum der Temperatur für die einzelnen Monate

3 ····· Mittleres Minimum der Temperatur für die einzelnen Monate

4 ▒ Säulen: Regenhöhe in mm

Saisonmalaria; kurze Dauer der Malariasaison, die erst nach Kuln Temperaturkurve auftritt, im November dann rasch abklingt.

Seasonal malaria; short duration of the malaria season which com temperature peak, declining rapidly in November.

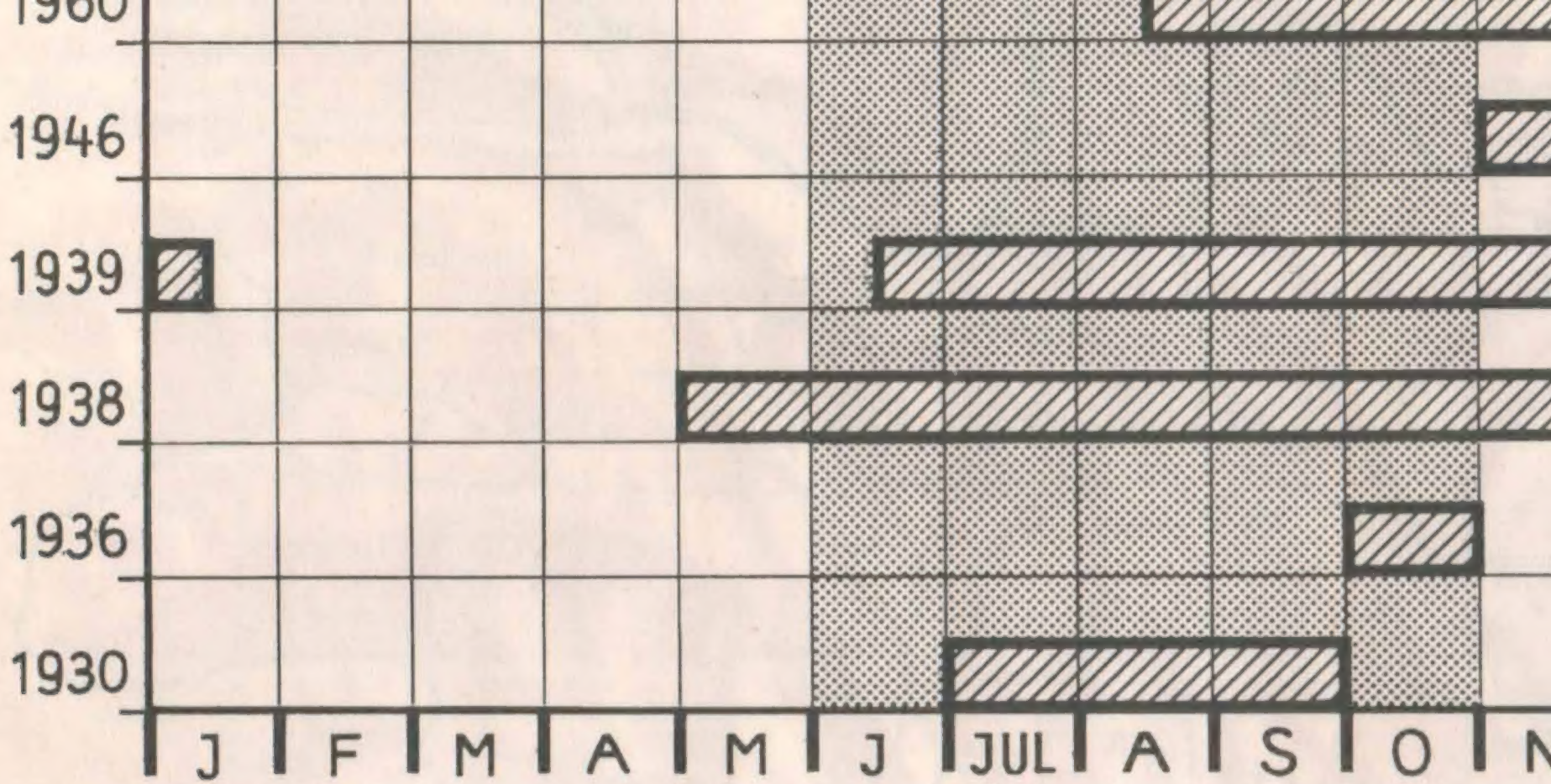


Abb. 12

Epidemisches Auftreten der Cholera in Afghanistan von 1930-1965 in Abhängigkeit von der Jahreszeit

Die Cholera ist in der Regel eine Krankheit der warmen Trockenzeit (weniger Regen monatlich; grau geschummerte Periode von Juni bis Oktober).

Zusammengestellt nach WHO-Berichten (513) und Off. Internat. d' Hyg. Publ.

Fig. 12

Cholera epidemics in Afghanistan, 1930-1965 in relation to seasons

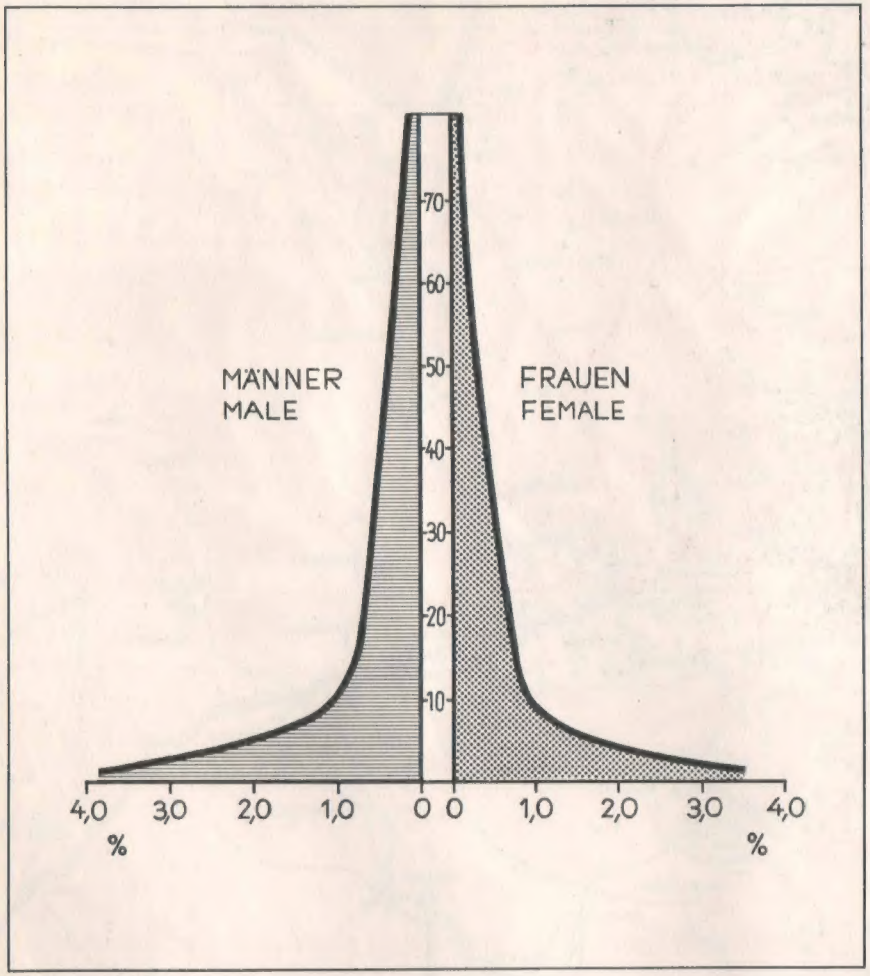
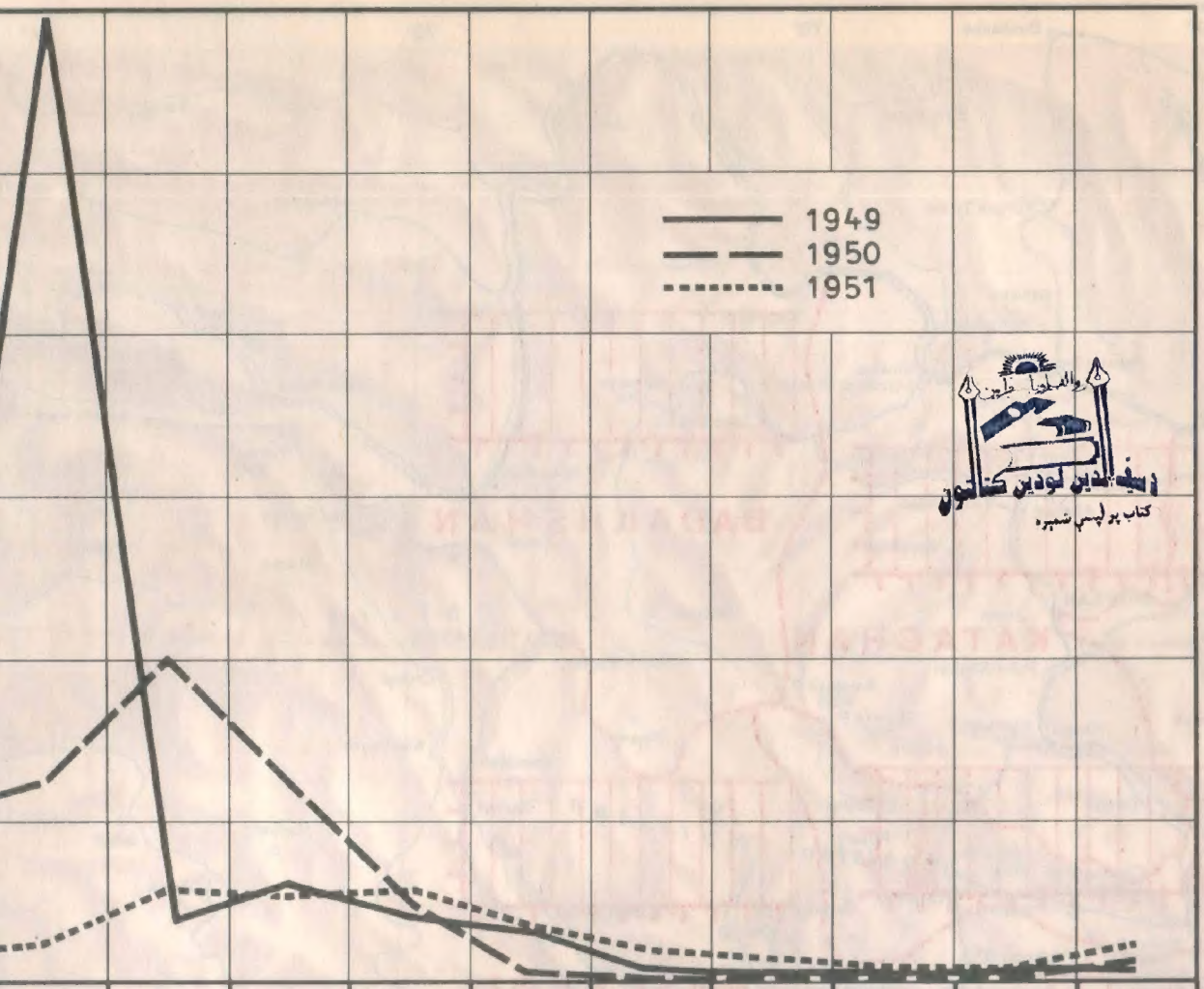


Abb. 5 **Altersaufbau der Bevölkerung im Raum von Kabul**
Nach Logar-Bericht der WHO; aus HAHN (50)

Fig. 5 **Age distribution of the population in the Kabul area**
According to WHO Logar-Report; from HAHN (50)

The Afghan provinces and their nur

No.	Provinz Province	qkm square km	Ei inh pe
1.	Kabul	3150	11
2.	Logar	4800	2
3.	Nangarhar	7400	7
4.	Kunar	9650	3
5.	Laghmaṅ	7500	2
6.	Kapisa	4700	3
7.	Parwan	10550	8
8.	Badakhshan	44800	3
9.	Takhar	13550	4
10.	Kunduz	7800	3
11.	Baghlan	14400	5
12.	Samangan	13050	1
13.	Balkh	14050	3
14.	Jawzjan	23550	3
15.	Faryab	22400	3
16.	Badghis	22900	2
17.	Herat	41550	6
18.	Ghor	31050	2
19.	Bamyan	23350	3
20.	Wardak	9400	3
21.	Paktia	9600	5
22.	Ghazni	22400	7
23.	Urozgan	29150	4
24.	Farah	58850	2
25.	Chakhansour	48850	1
26.	Hilmend	59900	2
27.	Kandahar	49050	6
28.	Zabul	19050	3
29.	Katawaz -Urgun	16550	5



M	A	M	J	J	A	S	O	N	D	TOTAL
1197	78	126	82	71	14	8	5	20	21	1835
254	405	248	105	10	5	2	4	5	23	1331
49	111	106	110	72	43	24	17	20	45	717

äufigkeit in Afghanistan 1949-1951

lnen Monaten gemeldeten Fälle. Größte kungen am Ende des Winters.

ch WHO-Berichten (513)

Fig. 10

Occurrence of typhus in Afghanistan, 1949-1951

Number of cases reported for the single month. Peak of morbidity at the end of the winter season.

Compiled from WHO Reports (513)

Abb. 11

Rückfallfieber in Afghanistan 1949-1959

Zahl der in den einzelnen Monaten gemeldeten Fälle (aus den Jahren 1949-59)

Zusammengestellt nach WHO-Berichten (513)